SPECIAL EDITION

EatingWell

Eating for Energy

Snacks for Every Workout

Don't Fear Carbs

Building a Better Breakfast

SPECIAL EatingWell EDITION

Eating for Energy

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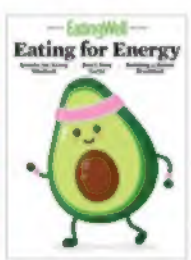
Parts of this special edition were previously published by *EatingWell*, *Real Simple* and *Health*.



There are two covers of this *EatingWell* special edition.

SOLVING THE ENERGY CRISIS

With the hustle and bustle of our busy lives, we are feeling more tired now than ever. But some simple diet tweaks and lifestyle changes could ramp up our depleting energy.

BY JOYCE HENDLEY

As a dietitian specializing in sports nutrition, Yasi Ansari, R.D., counsels many clients who are athletes wanting to improve their speed and endurance. But many of his other clients are just everyday people who hope that changes in their diet will help them feel less exhausted by the daily demands of living. "It's a common concern," says Ansari, the Los Angeles–based national spokesperson for the Academy of Nutrition and Dietetics. "Today everybody has a busy lifestyle."

And almost everybody wishes they had more energy. According to a 2015 poll by the research firm YouGov, 40 percent of Americans surveyed reported waking up feeling tired at least one to three times a week—and nearly as many reported four or more "poorly rested" days a week. And research by the National Safety Council (NSC) found that some 43 percent of Americans say they are "too tired to function safely at work."

How did we get to this energy crisis? When did life get so exhausting? The demands of our working lives are certainly a factor, whether due to too much overtime, lack of break time, working night shifts or simply the online office lifestyle that enables many of us to be reachable at any time, day or night. "In our 24/7 world, too many people are running on empty," said Emily Whitcomb, a senior program manager at NSC, in a press statement.

Employee burnout has become something of an epidemic; several countries, including Denmark, France and Portugal, consider "burnout syndrome" a valid reason for taking a sick day off from work. And the problem isn't just widespread; it's costly: when Kronos, a workplace-management-solutions company, recently polled 614 human resources

officers from various U.S. companies, it found that 95 percent claimed "employee burnout" was sabotaging their company's ability to retain workers.

Besides work burnout, another major de-energizer is sleep deprivation. Indeed, more than a third of us aren't getting the recommended seven hours of sleep a night, according to the Centers for Disease Control and Prevention. Those work-related stresses—and our never-ending to-do lists—can keep us up at night (as can the temptation to binge-watch our favorite shows or fall into video-streaming rabbit holes). Further, some sleep loss is attributable to aging: as we grow older, our sleep patterns change, with fewer periods of the deep sleep that help us feel rested. We might also have chronic illnesses or pains, such as arthritis or restless leg syndrome, that keep us awake or disrupt our sleep.

The electronic devices we now tether ourselves to can also rob our sleep. The blue light emitted by smartphones, laptops and tablets can interfere with our bodies' internal clocks, making it more difficult to fall asleep. (That's why the National Sleep Foundation recommends setting a digital curfew by turning off all electronic devices at least 30 minutes to two hours before bedtime.)

We can also hamper our sleep by drinking alcohol, which may first make us feel sleepy but disrupts sleep later in the night. Just a small amount of alcohol can matter; one 2018 study found that even a single drink impaired sleep quality by 9 percent—and the more the test subjects drank, the more their sleep was disrupted.

And while we might turn to caffeine to help us boost energy during the day, it can backfire by sabotaging sleep later if it's not consumed early in the day. A 2013 study found that drinking caffeine as much as six hours before bedtime significantly affected test subjects' sleep quality.

Our sedentary lifestyles contribute to our fatigue levels as well. While the U.S. Department of Health and Human Services recommends that all adults get at least 2½ to 5 hours of moderately intense activity (such as brisk walking) per week, fewer than a quarter of us (22.9 percent), specifically adults ages

18 to 64, actually make that goal. That means many are missing out on the energizing effects of physical fitness, such as a more efficiently pumping heart and cardiovascular system, and stronger muscles that make everyday activities less taxing. (Making matters worse, not getting enough daily activity can also interfere with our sleep quality, causing a fatigue double whammy.)

THIS MIGHT SEEM A PERFECT STORM OF FACTORS conspiring to zap our energy levels, but the good news is that there's a lot we can do to feel more energized. And much of it begins with our choices around food.

The food we eat and the energy we feel, of course, are inextricably linked: food is the fuel that powers every process in our bodies. A calorie is a measure of that energy—by definition, the amount of energy required to raise 1 gram of water 1° Celsius. In nutrition, it's the unit of measure for how much energy a food provides.

And we all need a good amount of energy just to fuel the daily work of being alive. Some 50 to 70 percent of the calories we eat are used for processes such as breathing, controlling body temperature and breaking down and making new cells. So eating enough calories to nourish and fuel our bodies is an important first step to feeling more energetic.

When patients complain of low energy, one of the first things that sports nutritionist Ansari does is to look at their dietary intake patterns—especially if they're on a restrictive diet, perhaps avoiding meat or any animal-based foods. She might recommend seeing a physician for blood tests to determine if there's a deficiency—for example, low iron, which can hinder blood cells from delivering oxygen to muscles and other tissues, or low levels of B vitamins, which help break down food for energy production. Her approach is to recommend "food first"—say, getting more vitamin-B-rich legumes, eggs and fortified breakfast cereals—and turning to a supplement only if there's a deficiency.

Beyond immediate solutions like these, eating for more energy also requires a holistic approach to being nourished: eating a varied diet that incorporates plenty of fruits and vegetables, adequate proteins and healthy fats, and whole grains and other minimally processed carbohydrates. That provides a healthy base of nutrients to fuel the body for the long haul—and relies less on quick energy fixes, such as caffeine and sweets.

For sustainable energy, getting good-quality carbohydrates is especially important, says Ansari. "Carbohydrates are our main source of fuel for our brain and body, and the most efficient one," she notes. "A lot of people want to limit their carbs, but I encourage them to like them—and to choose the right ones," such as fiber-rich whole grains, sweet potatoes, quinoa and oatmeal. Because these carbohydrates take longer to digest, she explains, they supply a sustained level of energy that can keep you fueled for hours.

By contrast, refined carbohydrate foods, such as sweets, white-flour breads and pastas, provide a quick boost of energy, but the resulting blood-sugar spike and the crash that follows can make you feel more tired (and, ironically, hungrier) sooner.

BEING WELL FUELED ALSO means eating in moderation. As anyone who's experienced a post-Thanksgiving food coma knows, getting too much at one meal can zap energy, no matter what you've eaten. A big meal requires the body to shift into "rest and digest" mode, to devote its energies to processing the food. Blood flow increases to the digestive tract, diverting less to muscles—and that's when the couch starts to look extra tempting.

The food we eat and the energy we feel are inextricably linked: food is the fuel that powers every process in our bodies.

(Another reason to eat moderately to boost energy: a big meal can be another cause of sleep deprivation. A 2011 sleep-clinic study of 52 men and women found that the more food people ate at night as late meals or bedtime snacks, the poorer their sleep quality tended to be.)

So no matter what kind of energy crisis you're facing, there are many ways to bring back vibrancy and energy into your life. By making it a priority to get daily activity, rest more and nourish yourself well, you'll help fuel a sense of empowerment over your own health—and that can be the most energizing part of all. ●

CHAPTER 1

Power Up Your Plate

For sustainable energy, not just a jittery burst, look to your diet for some simple and satisfying swaps.

WANT MORE ENERGY? DON'T CUT CARBS

Every kind of carb gives you a power charge. The trick is choosing the ones that will keep you fueled longer.

BY LISA LOMBARDI

Carbs can't catch a break. The food group gets blamed for everything from weight gain to inflammation, when really it's only unhealthy carbs that do health damage. In fact, carbohydrates in general are vital to your health. "Carbs are very misunderstood," says Samantha Cassetty, R.D., a nutrition consultant in New York City. "You cannot live without carbohydrates. They provide energy for movement, focusing, thinking and day-to-day life." Think of these underrated nutrients as your body's charging station. Sure, you also get energy when you eat foods with fat and protein, but "it's generally easier and more efficient for our cells to use glucose for energy," explains Cynthia Sass, R.D., C.S.S.D., a performance nutritionist based in New York and Los Angeles. That is why it's important to keep the healthiest carbohydrates in your diet, experts say, along with other energizing picks. And there are simple ways to get the charge that you need while avoiding the downsides associated with a carb-heavy diet (after-snack crashing, packing on unwanted pounds and so on).

Eat Carbs, Gain Fuel

When you eat carbs, your body breaks them down into their basic unit, which is glucose. "Glucose is the main source of energy for our body, such as gasoline is for a car," says Osama Hamdy, M.D., Ph.D., an associate professor of medicine at Harvard Medical School and the medical director of the Obesity Clinical Program at the Joslin Diabetes Center in Boston. Once glucose is absorbed, it goes to cells and releases energy.

There are two types of carbs: simple and complex. Simple carbs are in all those foods that we're

WHOLE GRAINS ARE AN IMPORTANT PART OF A HEALTHY DIET, PROVIDING ENERGY, FIBER, VITAMINS AND MINERALS IN EACH BITE.

told to avoid (white bread, white rice, chips, soda, sugar, etc.). Plus, they are in healthier picks, such as fruits, vegetables and dairy, where they are combined with nutrients like fiber. With one or two sugar molecules, these carbs are already in the form of glucose and get broken down quickly by the body. So they're easier for your body to use—but that isn't such a good thing.

Complex carbs—found in whole foods, such as brown rice, whole-wheat pasta, beans, fruits and vegetables—contain fiber and three or more sugar molecules. It takes longer for your body to break them down into glucose so that they're small enough to be absorbed from your digestive tract into your bloodstream. That means you get a slower, steadier stream of energy. "You want slow-burning energy instead of a quick rise and fall," says Cassetty.

Your health also suffers when you regularly choose cookies and croissants over spinach and grains. "High-glycemic-index carbohydrates like sugar in food transforms quickly to glucose, which enters the blood circulation very fast, causing a sudden jump in blood glucose level," says Dr. Hamdy. Eating something like a brownie or a hunk of bread stimulates our pancreas to produce a significant amount of insulin, he explains, which may contribute to weight gain, reactive hypoglycemia and insulin resistance. "The carbohydrates from vegetables will give you the same glucose, but its glucose enters the bloodstream much slower," Hamdy adds.

If it's continuous pep you're after, steer clear of the sugary stuff. And sorry, sweet treats are not giving you much of a quick boost either.

So if it's continuous pep you're after, steer clear of the sugary stuff. And sorry, sweet treats are not giving you much of a quick boost either. The whole idea of getting energized from sugar is a myth, according to a 2019 study review of 31 research papers led by researchers at the University of Warwick, Humboldt University of Berlin and Lancaster University. Among the surprising findings of the review: people who consumed the most sugar felt more tired and less alert. The researchers also found that sugar had no positive effects on mood, regardless of how much was consumed. "Sugar actually led to more fatigue and less focus," says Cassetty, who wasn't involved in the research. "Sugar made people feel worse."

Powering Up Workouts

Did you know that your body also stores glucose in your muscles to fuel everyday motion and exercise? If you're about to work out hard for a long time—say you're running a marathon or going on a long hike or bike ride—you should bring some instant energizing fuel with you, since you probably won't be able to eat enough ahead of time to meet your body's fuel needs, says Sass.

The easily digestible carbohydrates in sports drinks, such as Gatorade, can be an exerciser's best friend when it comes to refueling after a long, grueling workout. This is one instance when the quick hit of instant carbs can work to your advantage. "These products are formulated in ways that make them readily absorbable so they can quickly enter the bloodstream and provide fuel to cells," she explains. "Without this fuel, you may end up hitting the wall, so in this case these products' added sugars can be beneficial."

OK, maybe you're not competing in a triathlon, but what if you're heading to a yoga class or out for a power walk? Should you try to grab some carbs before you go? That depends on your own food for the day and how intense your workout will be. While most people don't need to eat before a workout and will only end up consuming extra calories, if you're doing a particularly long workout or won't be eating for several hours after, have a light bite that includes complex carbs, Cassetty says. Opt for easier-to-digest but slow-burning snacks, such as a little oatmeal or whole-grain toast with nut butter, she says.

Crash Control

Ever noticed how when you go on a very-low-carb diet, you feel like you're dragging? Dubbed "the keto flu," this happens because your body is trying to adjust to the lack of carbs. Since carbs are your body's main energy source, "most people feel better consuming carbs throughout the day," says Cassetty. But what about all those folks who say they feel newly energized on a super-low-carb plan? "It's often because they've eliminated

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RESEARCH SHOWS THAT SPORTS DRINKS WITH ELECTROLYTES FUEL PROLONGED PHYSICAL ACTIVITY BETTER THAN PLAIN WATER.

+
TRY SWAPPING
OUT YOUR SWEET
OATMEAL FOR A
SAVORY VERSION

sugar and refined carbs," which can deplete energy, she says.

At the Joslin Center, Hamdy works with people who have diabetes or who are at risk for developing the disease. Rather than cutting carbohydrates outright, Hamdy advises these patients to change the type and amount of carbs they eat. The carb goal: 40 to 45 percent of a person's daily calories. That includes prioritizing carbs with a low glycemic index, such as vegetables, and having a moderate amount of fruits, whole grains, legumes and dairy. Hamdy recommends cutting or limiting three categories of carbohydrates: sugary foods; products containing wheat flour; and potatoes, rice and other starches.

How to Eat Carbs Now

Even if you aren't at risk for diabetes, you can't go wrong by simply focusing on adding complex carbs and cutting added sugar. So how much sugar should we have? According to the American Heart Association, women should have no more than 25 grams of added sugar a day (that's 6 teaspoons); men should have no more than 36 (9 teaspoons). Pay attention to labels, since sugar can sneak into places where you're not expecting it. "Some very healthy-seeming foods can have added sugar," warns Cassetty.

It's not only in snacky stuff, such as pita chips, granola bars and crackers. It's also often in salad dressing, whole-wheat bread, yogurt and beef jerky. And you might be surprised at how much is hiding in your coffee drinks. A serving of sweetened almond milk has 13 grams of sugar, so if you're getting a simple almond-milk latte, you're plowing halfway through your recommended sugar intake for the day with that one drink.

Pairing carbs with other energizing foods is also an easy way to make sure you're getting a powerful mix. "When you need energy and want to tame your appetite, I recommend produce, either fruit or vegetables, with a healthy fat or protein," says Cassetty. "There are a lot of ways to mix and match that will take the edge off your hunger and also give you energy." Some easy-to-pull-together pairings that she recommends to her busiest clients: a banana with some pumpkin seeds, carrot sticks with a little guacamole or hummus, apple or pear slices with almond or other nut butter, cottage cheese with cucumbers, and hard-boiled eggs and some grapes.

Sass counsels clients to take their activity level into consideration when determining their daily diet. For example, a person with an active job will require more carbs than someone who sits at a desk all day. "That's one of the nice things about personalizing your meals and snacks—you can adjust your carb portions from day to day or within a day. The goal should always be to create balance," she says. "While it's not necessary to completely avoid added sugars, they should be limited and consumed as part of a balanced, nutrient-rich whole-foods diet."

Sass stresses that we have to let go of our fear that any carbs will make us pack on pounds. "People have been successfully losing weight on moderate-carb diets and keeping it off for decades," says Sass. "It all comes down to the quality of the carbs, the amount and timing." Some keys: choose whole-food sources of carbs (a baked sweet potato over veggie chips, oatmeal over an oatmeal snack bar), choose portions that make sense for you, avoid added sugar (so flavor your iced tea with mint and lemon, not sugar) and time your carbs so you're getting more before more active hours and less before the more sedentary times of day. You need fuel when you're most active, not when you're winding down for the night, Sass points out.

People who consumed the most sugar felt more tired and less alert. The researchers found that sugar had no positive effects on mood.

Too often, people don't eat a balanced breakfast—or worse yet, skip that meal entirely. "When you skip meals, you're denying your body a source of fuel," Cassetty says. Have you ever tried to drive a car with no gas in it? That's essentially what you're doing when you skip a healthy morning meal.

And finally, about our favorite boost: caffeine. Don't worry, unsweetened coffee and tea get a thumbs-up from experts. "People think of it as a vice they need to give up, but coffee and tea are plants, provide antioxidants and can have health benefits, such as lowering the risk of type 2 diabetes," says Cassetty. Just make sure you're not relying on your cup of joe to get you through the day. That could be a sign you're not getting a nourishing mix of food—healthy carbs included. ●

Beware of the Can

Highly caffeinated energy drinks can be dangerous.

BY KAREN ANSEL

How much would you pay for a drink that promises to revitalize your mind and body, elevate your energy or give you the focus you need to cross every item off your to-do list? Usually carbonated, energy drinks that contain caffeine and other ingredients (such as taurine and ginseng) are intended to do just that. Catching a third wind is priceless, which is why energy-drink sales reached $55 billion in 2017 and are expected to hit $84 billion by 2025. But there may be a hidden cost.

As sales have skyrocketed, so have reported energy-drink-related emergency room visits: between 2007 and 2011, they doubled from about 10,000 to nearly 21,000 visits. Between 2004 and 2014, at least 34 deaths were linked to energy drinks. In some cases it's possible that underlying heart issues may have been aggravated after drinking a high quantity of energy drinks, and since a product's mention in an FDA report does not mean it played a role in a death or an injury, "no one really knows how dangerous [energy drinks] are," says Michael Jacobson, Ph.D., longtime executive director of the Center for Science in the Public Interest. "They certainly raise a caution flag about drinking too much [caffeine] too quickly." A 2018 study found that while 81 percent of teens surveyed reported that they consumed one energy drink or less a week, 40 percent reported an adverse effect while ingesting these beverages.

These purported power drinks aren't being guzzled just by teens. The largest increase in energy-drink-related ER visits was among people over 40. This may be due to interactions with prescription medications. Energy drinks may deliver an instant jolt that java doesn't. "Some contain large amounts of caffeine. And they're consumed differently than coffee. [Energy drinks] are gulped rather than sipped," says Jacobson.

And that's exactly where the problem lies. "In

the ER we'll usually see somebody who has heart palpitations or maybe hand or body tremors from drinking too many. However, we have seen a few patients who have had seizures," says Sean Nordt, M.D., Pharm.D., the professor of pharmacy at Chapman University, who led the 2018 study on teenagers. These reactions aren't imaginary, either: a study presented at the American Heart Association's 2013 Scientific Sessions found that downing energy drinks raises systolic blood pressure by an average 3.5 points and can cause potentially fatal irregular heartbeats.

The most active ingredient in energy drinks is caffeine. While some brands have just 50 mg, others pack as much as 215 mg. To put that in perspective, an average 8-ounce cup of coffee contains roughly 100 mg, and most experts advise limiting your caffeine to 400 mg a day max. Energy-drink manufacturers are not required to list the amount of caffeine their products contain—whether the drinks are marketed as beverages or dietary supplements—unless it's added in the form of pure caffeine. If a drink's caffeine comes in the form of coffee, tea or another substance, such as guarana, that naturally contains caffeine, you might not know the total amount.

Energy drinks can be dangerous on their own, and they're potentially more perilous when combined with alcohol, a pairing that has gone mainstream. Bars serve cocktails like "1.21 Gigawatts," a concoction of Red Bull, raspberry vodka, cognac and grenadine. When you mix alcohol and caffeine, their effects blunt one another. "The caffeine makes you think you're sharper than you are," says Kent Sepkowitz, M.D., from the department of medicine at Memorial Sloan Kettering Cancer Center in New York City. "But your judgment is still that of a drunk person."

Then there's the question of whether energy drinks even deliver on their promises. Caffeine has been shown to help people think more clearly and improve exercise endurance, but just a small amount (as little as 1.5 mg per pound of body weight, or about 2 cups of coffee for a 150-pound person) will provide a boost—and more is not better.

Overall, when consumed solo and in moderation, energy drinks can be fairly safe products. "But you need to look at each one individually," says Nordt, and know what's in your drink. ●

HIDE AND GO SWEET

Low-energy and artificial sugar substitutes might seem like a swap for crash-inducing sugar. Here's what you need to know about the no-cal alternatives that turn up in all kinds of foods.

BY JOYCE HENDLEY

Maybe you think you don't use sugar substitutes. Maybe you steer clear of diet sodas and "lite" foods to avoid chemicals like aspartame. But if you've eaten certain high-fiber cereals, salad dressings or frozen entrees—or even sipped some nondiet iced teas—then you've probably consumed a lot more of them than you realize. And your odds are only growing: the use of sugar substitutes in packaged foods has been rising steadily for the past decade; the amount in our food supply now tops 26 pounds per person annually. The global sugar substitutes market (including both artificial and natural no-calorie sweeteners) reached a value of $15 billion in 2018. The market is expected to reach $19 billion by 2024.

Not only are these sweet nothings cropping up in more and more foods, but there are also more sugar substitute options, period. With today's consumers clamoring for "clean" ingredient lists, food-and-drink makers are increasingly turning to "natural" plant-based sweeteners. Trending now are products using stevia leaf extract and monk fruit extract (from an Asian melon), as well as erythritol, a sugar alcohol found in certain fruits.

Many of these sugar substitutes—both new and old—have spurred a lot of concerns and confusion: Are alternative sweeteners necessary weapons against the ills caused by our overly sweetened lifestyles? Or are they the toxic, junk-food additives their detractors believe them to be? Here's our take based on the science-backed research.

Can They Help You Lose Weight?

Yes—but only a little. A small but strong handful of clinical trials suggests that using sugar substitutes—

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SEEMINGLY HEALTHY SUGAR-FREE JAM AND REDUCED-SUGAR KETCHUP ARE SNEAKY SOURCES OF ARTIFICIAL SWEETENERS.

usually in the form of diet beverages—can help people lose weight, especially those "who are getting a fairly prudent diet already," according to obesity expert Barry Popkin, Ph.D., a professor of nutrition at the University of North Carolina at Chapel Hill. One major review involving more than 1,900 participants concluded that when sugar substitutes and low-calorie foods were swapped in for their full-calorie counterparts, people lost an average of 1 to 2 pounds.

Another study found that when 31 men and women snacked on crackers with sweetened cream cheese before lunch and dinner, they felt just as satisfied when the cream cheese was sweetened with stevia or aspartame as they did with sugar, despite taking in about 300 fewer calories. That said, large, long-term studies show that people who regularly consume sugar substitutes aren't leaner—and are sometimes heavier—than those who don't. Why the discrepancy? One factor is what Popkin calls "the Big Mac with a Diet Coke" effect—the all-too-human self-foolery that happens when we eat something labeled "diet," then feel entitled to pig out because we were "good."

Bottom line? If you use sugar substitutes wisely—swapping them for their full-on-sugar counterparts and keeping the rest of your diet sensible—they may make your weight-loss journey a little sweeter. "But they're never going to be a magic bullet," says Popkin.

Do They Amp Up Your Taste for Sweet?

Not any more than sugar does. We already have a hard-wired love of sweetness, and health advocates say that with so much added sugar in our food supply—even in things like crackers and ketchup—many of us have become used to a higher level of it. Since sugar substitutes are often hundreds—sometimes thousands—of times sweeter than sugar, some experts worry they'll flood our sweet taste receptors, causing us to crave ever-stronger amounts of sugariness and make naturally sweet, nutritious foods, like fresh fruit, seem dull by comparison.

Of course, foods sweetened by sugar substitutes aren't hundreds or thousands of times sweeter than the regular stuff. And concerns about them creating a supersweet tooth don't hold up to scientific scrutiny. One study that Popkin co-authored found that when overweight people swapped their usual two daily servings of sugar-sweetened beverages with diet drinks or water for six months, the diet group took in, on average, about 40 fewer calories from desserts and added sweeteners than the water group. "The study pokes a hole in the idea that people who drink diet beverages have an increased preference for sweet tastes," says Popkin.

Do They Screw Up Your Microbiome?

Possibly, yes. A 2014 study at the Weizmann Institute in Israel found that mice that were fed a fairly high daily dose of saccharin, sucralose or aspartame for 11 weeks began to develop symptoms of glucose intolerance, a precursor to diabetes. Suspecting that gut bacteria (the "microbiome") might be involved, the researchers did further testing using saccharin, the sweetener that had the biggest effect—and discovered changes in the mice's gut bacteria that are associated with a high risk of obesity and diabetes.

To see if something similar might happen in humans, the team then recruited seven healthy, lean volunteers—none of whom normally consumed artificial sweeteners—and fed them a daily dose of saccharin that was high but within the FDA's acceptable limit (equivalent to 10 packets of Sweet'N Low). After a week, four volunteers developed glucose intolerance and their gut bacteria shifted toward those linked to obesity and diabetes.

The study generated major buzz, "but as impressive as it is, it's only one study," notes Justin Sonnenburg, Ph.D., an assistant professor of microbiology and immunology at Stanford University School of Medicine and a co-author of *The Good Gut*. "It does reinforce that what we eat directly impacts our health and our gut microbiota—that's incredibly clear."

Ultimately, though, experts say there's a bigger-picture issue here—beyond whether sugar substitutes are good or bad for us. The real problem is the sheer amount of sweet stuff of any kind in our food supply—a whopping 140 pounds' worth annually for every adult in the U.S. So making an effort to cut down on sugar (real and fake) is a smart idea. We're not saying life can't be sweet—on occasion, sugar substitutes are fine—but they aren't necessarily the better choice, for your health or your waistline. ●

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THE AMERICAN HEART ASSOCIATION RECOMMENDS THAT MOST WOMEN CAP THEIR ADDED SUGAR INTAKE AT 6 TEASPOONS PER DAY (9 TEASPOONS FOR MEN).

10 Ways to Snack Smarter

These tips will help you choose snacks to benefit your body and keep you energized without packing on pounds.

BY LISA VALENTE, M.S., R.D.

Eating a snack or two between meals can curb hunger so that you don't inhale the dining room table when you finally sit down to dinner. Reaching for the right snack will boost your energy and beat an afternoon slump. On the flip side, grazing all day—particularly on foods of little nutritional value—may result in eating too much and packing on extra pounds. The key is taking a smart approach to snacking. Here are 10 simple strategies to get you started.

1 COMBINE PROTEIN AND CARBOHYDRATES. Try pairing protein-rich foods with a carbohydrate (say, some almonds with an orange) or snacking on roasted chickpeas, which offer a good natural mix of carbs and protein. They're also high in fiber, which research suggests may help prevent weight gain and may even help you lose weight. Carbohydrates provide both your body and your brain with energy, plus protein-rich foods help fill you up because they break down more slowly in the body.

2 CHOOSE YOUR "MIDNIGHT" SNACK WISELY. If dinner was on the light side and you need a little pre-slumber snack, there may be a food combination that promotes zzz's. Specialists recommend a snack that's rich in carbohydrates and contains a bit of protein; this combination is said to increase the tryptophan levels in the brain, causing you to sleep more soundly. Try low-fat yogurt with a sprinkle of granola, a small bowl of oatmeal or a sliced apple with a bit of peanut butter.

3 KEEP CHEWING. Savor your snack by chewing it slowly and thoroughly. One study found that people who chewed almonds thoroughly (up to 40 chews) felt full longer than those who chewed the same amount of nuts fewer times.

4 TOSS GRAPES IN THE FREEZER FOR AN EASY SNACK. Because they're cold, you have to savor them slowly to avoid

brain freeze (ouch!). Research shows that eating slowly helps you cut down on how much you eat because you have time to register how full you are. You'll get a lot of sweet satisfaction for just a handful of calories.

5 **INDULGE IN A SMALL TREAT.** In fact, giving yourself treats may be the secret to losing weight—for good. If you like a glass of wine with dinner, make room for it. Prefer dessert? Skip the drink and go for a low-calorie chocolate treat instead. Savoring a small treat each day won't sabotage your weight-loss efforts, says research in the *Journal of the American Dietetic Association*.

6 **SNACK (AND MULTITASK) MINDFULLY.** Munching mindlessly in front of the TV is a surefire way to gain unnecessary pounds. In a recent study published in the *American Journal of Clinical Nutrition*, people who ate a meal without distractions felt more satisfied and ate less later in the day. But that doesn't mean you can never enjoy your favorite program with a snack. Make sure the snack is a healthy choice, like air-popped popcorn, and sit down with just an individual serving size to prevent overeating.

7 **FILL ANY NUTRITIONAL GAPS.** Make your snacks count. Since most people don't get enough fruits and vegetables, consider snacking on celery with a little peanut butter, or yogurt with fruit, as an easy way to eat more produce.

8 **BROWN-BAG YOUR SNACK.** Skip the vending machine and satisfy the afternoon munchies with a healthy snack you packed at home. You'll save money and most likely get a bigger bang for your nutritional buck. In fact, buying snacks on the go can be twice as expensive as bringing them from home. "Homemade" baby carrots and hummus costs $1; prepacked versions will run you $2. Plan ahead to get snacks that do good for your wallet and your waistline.

9 **SNACK ON CITRUS.** Grapefruit's "diet food" rep might be justified: one study found that when people simply ate grapefruit with each meal, they lost up to 3½ pounds over three months. Grapefruit may help manage appetite by lowering insulin levels, say researchers.

10 **DON'T GET TRIPPED UP BY TRAVEL.** However often you fly, prepare in advance so you'll have healthy snacks to eat en route. For shorter flights, pack ¼ cup dried fruit (such as apricots), a handful of nuts or seeds and a few whole wheat crackers as healthier alternatives to the salty snacks served in flight. Sip plenty of water; low humidity and recirculating cabin air can be dehydrating. ●

HIGH-POWERED PRODUCE

Wendy Bazilian, Dr.P.H., R.D.N., says superfoods can help build and repair muscles, aid in hydration and balance energy. These key fruits and vegetables can bolster your everyday energy and overall health.

BY SUSAN BRICKELL

Artichokes

Though they may be a surprising pick to some, Bazilian credits artichokes for their fiber and particularly high antioxidant count. "A whole medium artichoke has only 60 calories and 10 grams (over a third of your daily recommendation!) of fiber," she says. Try the veggie as a topper for pizza, pastas and salads.

Blueberries

Known for their powerful anti-oxidants, this snackable fruit boosts immunity, reduces inflam-mation, supports brain health and protects against heart disease and cancer. Research suggests that the antioxidants in blueberries may also help ward off muscle fatigue by mopping up free radicals that muscles produce during exercise. Now that's a superfood.

Apricots

Bazilian recommends apricots for a low-calorie, high-fiber dose of vitamins A and C, which are "important for keeping our immune system functioning at its best, our skin healthy and preserving vision as we age." She suggests incorporating the underrated fruit into your diet by mashing some into a salsa for fish or chicken, putting them in pancake batter or simply eating them on their own.

Asparagus

The veggie is high in antioxidants and low in calories, supports digestive health and immunity and helps lower blood pressure, says Cynthia Sass, R.D., C.S.S.D. It is also high in B vitamins and fiber, which support healthy energy levels. Asparagus can be eaten at any time of the day, whether it's with eggs and smoked salmon at breakfast or with a chicken breast and brown rice for dinner after a workout.

WHEN YOU BUY ASPARAGUS, IT'S BEST TO EAT IT RIGHT AWAY BECAUSE THE LONGER A BUNCH SITS, THE MORE THE ENDS DRY O

THE FDA RECOMMENDS THAT ALL AVOCÁDOS BE WASHED BEFORE OPENING.

Avocados

Seems like there's nothing this super veggie—ahem, fruit!—can't be used for, and with several peak seasons, it's easy to get your hands on one. Once you finally find a ripe one, try avocados in a variety of recipes, from toast to smoothies. In *The SuperfoodsRx Diet*, Bazilian praises the pick: "A source of 20 vitamins and minerals, avocados also help make us feel fuller longer due to their fiber and heart-healthy mono-unsaturated fats."

Strawberries

Bazilian loves this antioxidant powerhouse and heart-shaped fruit for its fiber and vitamin C. "Vitamin C is essential to a healthy immune system, helping wounds heal properly, building and maintaining cartilage and keeping your skin healthy and vital too," she says. Just 1 cup of strawberries provides 12 grams of carbs and 3 grams of fiber, which help enhance energy levels. Add strawberries to sweeten oatmeal in the morning or mix slices into your salad at lunch. ●

Mealtime Done Right

Whether you're trying to lose weight, improve your overall health or maximize your energy, when you eat makes a difference.

BY HALLIE LEVINE

Sure, there is some truth to that adage "You are what you eat." But the latest research shows that when you eat can be just as crucial. "Eating in tune with your circadian rhythms—aka your body's inner clock that guides you to wake and sleep—automatically helps your health. You are getting fuel when you can actually use it and allowing your body to rest when it needs to," says Michael Roizen, M.D., the chief wellness officer of the Cleveland Clinic and a co-author of *What to Eat When*. In fact, according to a 2015 study, ignoring these rhythms and eating at the wrong times—say, late at night—can raise blood sugar, a risk factor for type 2 diabetes. Want to understand meal timing a bit more? Experts weighed in on the four key guidelines to follow.

EAT DURING DAYLIGHT HOURS. "Our bodies evolved to be primed for food during the day so that we'd have plenty of energy for survival," says Dr. Roizen. This means your body is most sensitive to insulin—a hormone that moves glucose from your blood into the majority of cells, including your muscle cells, to be used as fuel—during the day. Your resistance to insulin is highest at night, when you're less active and your body thinks it should be slumbering. As a result, you wind up storing most of the calories you consume in the evening as fat, Roizen says. But between after-work Spin classes and evening cocktail hours, you can't always expect to pack in all your nourishment before the sun sets, especially during the winter months when it gets dark as early as 4:30 p.m. A more realistic option: "Try to eat during a 12-hour window each day—for example, from 7 a.m. to 7 p.m.—and then go on kitchen lockdown after that," says Pamela Peeke, M.D., M.P.H., an assistant professor of medicine at the University of Maryland and the author of *The Hunger Fix*.

HAVE A HEARTY LUNCH. Unless you eat a big breakfast, lunch should absolutely be the main meal of your day. "Treat it how you'd normally treat dinner," advises Tamara Duker Freuman, R.D., the author of *The Bloated Belly Whisperer*. Fill half your plate with non-starchy veggies, and then divide the second half into lean protein and high-fiber carbs like sweet potatoes or quinoa. Even if you had a hefty morning meal, don't skimp on lunch. "Ideally, you'll consume about 75 percent of your calories by 4 p.m.," says Freuman. If you normally eat a salad, pair it with a lentil soup, which is rich in fiber and protein, or add some nut butter and apple slices to your usual deli sandwich. People who ate their main meal at lunch lost more weight than folks who ate later, according to a 2016 study published in the *American Journal of Clinical Nutrition*.

EAT A LIGHT DINNER AND THEN CLOSE THE KITCHEN. Since your body is most insulin-resistant at night, you want to avoid carb-laden fare such as pasta and potatoes. Try a serving of lean protein paired with fiber-packed fruits and veggies, says Peeke. While earlier is better, if you end up occasionally eating at 8:30 or 9 p.m., that's fine. Just have a snack a couple of hours before, says Freuman, so you don't become so famished you wind up eating a huge meal right before bed. Whether you eat dinner earlier or later, try to avoid eating anything after it, advises Freuman. Late-night noshing has been linked to a bunch of bad health effects, including an increased risk of type 2 diabetes and heart disease. Healthy adults who were allowed to eat right up until bedtime had higher levels of fasting blood sugar and cholesterol than those who had a hard stop at 7 p.m., according to a small 2017 University of Pennsylvania study. So by all means, watch what you eat. But don't forget to keep an eye on the clock too. It will be time well spent.

FEAST OR FAMINE? 16:8. 5:2. 18:6. Nope, these numbers aren't some weird code. They refer to different types of intermittent fasting, which means cycling between periods of eating and periods of, well, not. For example, eating only during an eight-hour window each day. While intermittent fasting does promote weight loss, it might not be more effective than traditional low-calorie weight-loss diets, according to a study of 150 patients published in November 2018 in the *American Journal of Clinical Nutrition*—the largest review to date. "The problem with intermittent fasting is that some methods are hard to stick to, especially long term," says Peeke. If you have trouble following an intermittent schedule, you can get many of the same benefits by following a 12-hours-on, 12-hours-off eating strategy. ●

+

WHILE EATING MEALS AT THE SAME TIME EVERY DAY HAS ITS BENEFITS, IF YOU CAN'T, THERE ARE PLENTY OF OTHER WAYS TO STAY HEALTHY.

Power Foods

Put these power foods to work. These recipes highlight the energy-boosting produce mentioned in this chapter.

Grilled Ancho Chicken & Apricot Salsa

ACTIVE: 30 min
TOTAL: 30 min

Grilling not-quite-ripe stone fruit is a mouthwatering way to bring out its natural flavor and sweetness. Ancho chile has a rich, mild flavor. If you can't find it, use mild chili powder in its place.

- 4 chicken breast cutlets (about 1 pound)
- 2 tablespoons extra-virgin olive oil, divided
- 2 teaspoons ancho chile powder
- ½ teaspoon garlic powder
- ½ teaspoon salt plus ⅛ teaspoon, divided
- 4 apricots, nectarines *and/or* peaches, halved and pitted
- 1 ripe avocado, chopped
- ¼ cup coarsely chopped fresh cilantro
- 3 tablespoons finely chopped red onion
- 1 jalapeño pepper, seeded and thinly sliced
- 1 tablespoon lime juice
- 4 lime wedges

1. Preheat grill to medium-high.
2. Brush both sides of chicken with 1 tablespoon oil and sprinkle with chile powder, garlic powder and ½ teaspoon salt. Brush the cut sides of the fruit with the remaining 1 tablespoon oil.
3. Grill the chicken, turning once halfway, until an instant-read thermometer inserted into the thickest part registers 165°F, 6 to 8 minutes. Grill the fruit, cut side down, until slightly softened and beginning to char, about 4 minutes.
4. Meanwhile, combine avocado, cilantro, onion, jalapeño, lime juice and the remaining ⅛ teaspoon salt in a medium bowl. When the fruit is cool enough to handle, chop and stir into the salsa.
5. Serve the chicken with the salsa and a lime wedge.

SERVES 4: 1 cutlet & ¾ cup salsa each
CAL 307 / **FAT** 18G (SAT 3G) / **CHOL** 83MG / **CARBS** 11G / **TOTAL SUGARS** 4G (ADDED 0G) / **PROTEIN** 27G / **FIBER** 4G / **SODIUM** 433MG / **POTASSIUM** 773MG

ANCHO CHILE POWDER ADDS A RICH, MILD FLAVOR TO LEAN CHICKEN BREASTS.

No-Bake Berry Cheesecake Bars

ACTIVE: 20 min **TOTAL:** 2 hrs 20 min
TO MAKE AHEAD: Refrigerate for up to 1 day.

As if no-bake weren't tempting enough, consider that the graham cracker crust has pecans in it. Ooh la la! In the filling, nonfat Greek yogurt and reduced-fat cream cheese cut the calories and sat fat.

- **7 ounces graham crackers, broken into large pieces**
- **½ cup toasted pecans**
- **¼ teaspoon salt**
- **⅓ cup canola oil**
- **2 8-ounce packages reduced-fat cream cheese, softened**
- **2 cups nonfat plain Greek yogurt**
- **⅔ cup confectioners' sugar**
- **1 teaspoon lemon zest**
- **1 tablespoon lemon juice**
- **5 cups fresh berries**

1. Pulse graham crackers, pecans and salt in a food processor until finely ground. With the motor running, drizzle in oil, then pulse to combine. Press into a 9-by-13-inch baking dish.

2. Add cream cheese, yogurt, confectioners' sugar, lemon zest and lemon juice to the food processor. Puree until smooth, about 1 minute. Dollop the mixture over the crust, then gently spread into an even layer. Cover and refrigerate until cold, at least 2 hours and up to 1 day.

3. To serve, top with berries and cut into 16 squares.

SERVES 16: 1 square each
CAL 245 / **FAT** 14G (SAT 5G) / **CHOL** 8MG / **CARBS** 23G / **TOTAL SUGARS** 13G (ADDED 9G) / **PROTEIN** 6G / **FIBER** 3G / **SODIUM** 224MG / **POTASSIUM** 152MG

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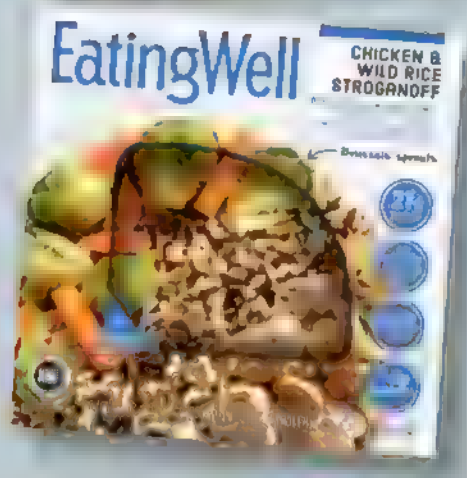

CHAPTER 2
Fuel Good Health
From powering intense cardio to recovering after strength training, certain food choices matter when it comes to energy for exercise.

THE POWER OF PROTEIN

Its muscle-building and weight-control properties have made protein a mealtime hero. Yet protein's most impressive superpower may turn out to be its ability to keep you energized all day long.

BY HOLLY PEVZNER

We're a fatigued bunch, overworked and under-leisured, always seeking ways to boost energy and productivity—especially through what we eat and drink. We down the coffee, we dabble in energy drinks, we take a little extra B_{12} or whatever the supplement of the moment is, because that's supposed to help, right? While we're all feverishly looking for the Perfect Fix, however, we're often missing an unsung energy hero that's been in our kitchens all along: protein. It's understandable, really. Protein has often been confused for its alter ego, a weight-control and muscle-building champion. But the thing is, protein is also key to delivering the long-lasting energy we need, even if only 10 percent of us turn to protein for that purpose, according to an International Food Information Council survey.

A Different Kind of Energy

You know that zap, pow, boom you get from your morning coffee? Or the instant surge you garner from a toast-and-jam breakfast? That's not what protein offers. "There's no noticeable whack of energy," says Douglas Paddon-Jones, Ph.D., a professor of nutrition and metabolism at the University of Texas Medical Branch at Galveston. And that's a good thing. With caffeine, for instance, the "energy" you feel is not actually energy, metabolically speaking. It doesn't fuel your cells. Instead, it bolsters your mental alertness for a few hours, all while leaving your energy-sapped body in the dust. And with certain meals that are heavy in sugar or simple (also known as "refined") carbohydrates, your energy does spike—and fast—but it's short-lived. Here, the body quickly churns out insulin to counteract the sugar you've just ingested. This, in turn, causes

YOU DON'T NEED TO TAKE DOWN A GIANT T-BONE STEAK TO GET YOUR PROTEIN FILL—3 OUNCES DELIVERS ABOUT HALF YOUR DAILY VALUE.

blood-glucose levels to fall, bringing on that telltale sugar crash, ensuring you feel more drained than when you started. "You go from hero to zero really fast this way," says Paddon-Jones.

On the other hand, protein, much like fiber, plays the long game. It helps slow the rate at which food and sugars are digested and absorbed, resulting in a gradual, more continuous blood-sugar rise. "It's those stable blood sugars, without sharp peaks and valleys, that help you feel more energized for longer," says Desiree Nielsen, R.D., the author of *Un-Junk Your Diet and Eat More Plants*.

Energy as a Happy Side Effect

According to Nielsen, a lot of the talk about protein is focused on how it can help you feel fuller longer and how it benefits muscles. Incidentally, both of these factors buoy energy. The slow-poke quality of protein absorption (plus its ability to activate the release of satiety hormones) is why people feel more satiated after eating a protein-laden meal than, say, one teeming with quickly digested refined carbs. "That full feeling can last three to four hours," says Melissa Majumdar, R.D., a spokesperson for the Academy of Nutrition and Dietetics and a senior clinical bariatric dietitian at Brigham and Women's Hospital in Boston.

"Eating protein and exercising to support healthy muscle architecture bring you energy. None of it occurs in isolation."

And staving off hunger for a long stretch is good for energy. A 2018 study in the journal *Psychopharmacology* found that a sudden drop in blood sugar spurred by hunger produces higher levels of the hormone cortisol, which then triggers not only stress but also low-energy, sluggish behavior.

It's also well established that the amino acids in protein are essential for maintaining healthy muscles. That's why elite athletes and bodybuilders require more than the average Jane. However, after age 30, people often begin losing as much as 3 to 5 percent of muscle mass per decade. While there are many reasons to keep muscles strong (the ability to protect our bones, for one), Paddon-Jones notes that having better muscle quality translates to more energy overall. For instance, almost a quarter of men and women ages 51 to 60 who failed to meet minimum protein requirements didn't have the stamina to stand for a long period of time and 11 percent had difficulty walking just a quarter mile, according to a 2019 study in the *Journal of Nutrition, Health & Aging*. "It's all connected," says Paddon-Jones. "Eating protein and exercising to support healthy muscle architecture brings you energy. None of it occurs in isolation." And none of it occurs if you don't actually eat the proper amount of protein.

How Much Do You Really Need?

"To be honest, there really are no good practical guidelines for getting the ideal amount of protein," says Paddon-Jones. Instead, we've got the recommended daily allowance (RDA), which for adults is 0.36 gram per pound of body weight. (That's about 50 grams of protein daily for a 140-pound woman, or roughly 1 cup of plain Greek yogurt and 3.5 ounces of chicken.)

"The recommended daily allowance is, essentially, the minimum quantity of protein needed to prevent deficiency. It's not the recommended amount for optimal function," says Paddon-Jones, who equates the RDA to the also-not-super-helpful body mass index. "They're both almost useless measures on an individual level because they don't factor in so many things, like activity and body composition."

Overall, it seems that most healthy adults are hitting—or exceeding—their RDA of protein, but more than 1 in 3 of those over age 50 aren't, notes the 2019 report mentioned earlier. The rest of us? While we may be consuming enough protein, we eat a mere 16 percent at breakfast, when we need energy the most, and about 40 percent at dinner, which doesn't do much of anything for all-day energy. In fact, because our bodies have a limited ability to store protein and access it later, "when we eat an abundance at one sitting, our body just turns that protein into glucose and fat," says Paddon-Jones. Meaning: you need to spread protein throughout the day to reap the benefits. Paddon-Jones's own 2014 research in

the *Journal of Nutrition* noted that consuming a moderate amount of protein three times a day was optimal. Plus, "protein sustains energy over 3 to 4 hours, so when you space it out accordingly, you feel that all day," says Majumdar. Of course, to best utilize the energy rewards, it's important to choose the right protein.

Are Some Proteins Better Than Others?

When it comes to energy and overall health, not all proteins are created equal. "It's important to consider the amount and type of fat in your protein, as well as other nutrients," says Jamie I. Baum, Ph.D., an associate professor and director of the Center for Human Nutrition at the University of Arkansas in Fayetteville, adding that most Americans eat a lot of animal protein—namely, a lot of red meat high in saturated fat.

"In the long term, if your main protein sources are filled with saturated fat, your chances of cardiovascular disease, cancer, obesity and other issues go up," says Majumdar. And in the short term, most of us don't feel very good after a large, high-fat meal. "Fat empties from the stomach at a markedly slow rate—beyond what helps with satiety," says Majumdar. That can leave you feeling sluggish.

The best course of action for energy: eat a variety of lean, protein-rich foods, including plant-based proteins, that are low in saturated fat. "In a pinch, a protein-based energy bar or a veggie burger containing soy-protein isolate can be OK, but it's a far better idea to select whole foods. The more processed something is, the less healthful it is," notes Majumdar.

"It can seem overwhelming and confusing, but it's really not," assures Paddon-Jones. "Just go meal by meal, remembering to include protein." That can be beans, nuts, lean meats, tofu, eggs, any number of foods. "And if eating a little bit more protein at a meal comes at the expense of you eating less of something crappy, that's a double win for health and energy." ●

Take Your Metabolism to the Max

Discover how to torch more calories every day in this complete guide to your body's fat-burning engine.

BY HALLIE LEVINE

It's no wonder metabolism is a subject of fascination and speculation: the process that turns food into fuel powers all that we do. "Even when you're sleeping, your body requires energy for things like breathing and repairing cell damage," says Donald Hensrud, M.D., the medical director of the Mayo Clinic Healthy Living Program. The number of calories you need to perform such basic functions is called your resting metabolic rate (RMR)—and it can affect everything from your waistline to your energy level. Read on to learn how to keep your metabolism revved so your body is operating at just the right speed.

DIETING CAN LOWER YOUR METABOLISM. "Whenever you cut calories, your metabolism slows down, often by more than you'd expect," says Kevin Hall, Ph.D., an obesity researcher at the National Institutes of Health. Studies have found that formerly obese people have a 3 to 5 percent lower RMR than people who have never had to lose weight. But such a drastic slowdown isn't inevitable. Other research has shown that regular exercise can counteract the effect. And a gradual weight-loss strategy can help keep your metabolism humming. A good rule of thumb: reduce caloric intake by no more than 500 calories a day, and torch roughly the same number through exercise. A 1,000-calorie daily deficit should help you lose about 2 pounds a week.

HOW TO CALCULATE YOUR RMR. If your goal is weight loss or maintenance, it's helpful to know the minimum amount of energy you need to fuel basic processes. You can get a rough estimate using the Mifflin-St Jeor equation. Just plug your weight in kilograms (to convert from pounds, divide your weight by 2.2), your height in centimeters (equal to your height in inches multiplied by 2.54) and your age into this formula: (10 × weight) + (6.25 × height) − (5 × age) − 161 = RMR in calories. To get a sense of how many calories you actually burn in a day, multiply your RMR by your activity level: 1.2 for sedentary (barely any or no exercise), 1.375 for lightly active (easy exercise one to three days a week), 1.55 for moderately active (moderate exercise three to five days a week), 1.725 for very active (hard exercise six or seven days a week) and 1.9 for extra active (possibly a physical job).

METABOLISM AND FASTING CYCLES. As mentioned on page 30, while some experts have advised against cleanses and other trendy fasts, research shows that alternate-day fasting—which entails eating without restriction one day, then consuming about 500 calories the next—does not negatively impact metabolism. Women who followed this plan for eight weeks lost an average of 13 pounds, according to a

RESEARCHERS SUGGEST EATING LEAN MEATS, SEAFOOD, LEGUMES, EGGS, DAIRY AND NUTS AS PROTEIN SOURCES TO SPEED UP METABOLISM.

study from the University of Illinois at Chicago. "When we compared the change in their resting metabolic rate to that of subjects who lost weight by consuming 25 percent fewer calories overall, we didn't see any differences between the two groups," says study author Krista Varady, Ph.D. What's more, after the first few days, most of the women in the alternate-day fasting group didn't report feeling hungry.

CHRONIC STRESS SLOWS YOUR BURN. Wigged-out and gaining weight? No, it's not in your head (unfortunately). Research suggests that when you're totally frazzled, your metabolism stalls. One reason: chronic stress stimulates the production of betatrophin, a protein that inhibits an enzyme needed to break down fat, per a University of Florida study. Other research found that women who experienced a stressful event the day before eating a single high-fat meal burned 104 fewer calories over the seven hours following the meal than did their more chillaxed counterparts. "The stressed women also had higher insulin levels, which contributes to fat storage," says study author Janice Kiecolt-Glaser, Ph.D., a professor at Ohio State University. According to Kiecolt-Glaser, these effects could lead to a gain of 11 pounds a year.

PROTEIN IS KEY. You've probably heard that the more muscle you have, the more calories you'll burn. And you know protein is essential for muscle growth and maintenance. Caroline Cederquist, M.D., an obesity specialist in Naples, Florida, and the author of *The MD Factor Diet*, says the trick is to divide your intake evenly throughout the day, since you can utilize only a 4-to-6-ounce serving of protein at a time. "If you consume more than that at one sitting, it will get stored as fat." Research backs up her advice: a 2014 study found that people who took in 30 grams of protein at each meal had 25 percent better muscle protein synthesis than those who ate 90 grams in a day in irregular portions (10 at breakfast, 15 at lunch and 65 at dinner).

PUMP IT UP. Strength training is a good way to combat the drop in metabolism that comes with age. But new research suggests that when you're lifting weights, the ideal strategy is to go slowly. Resting for two to three minutes between sets may actually promote more muscle growth than a shorter rest interval, according to a U.K. study published in 2016. "The most important thing is to just do it, two or three times a week," stresses Pamela Peeke, M.D., the author of *Body-for-LIFE for Women*. To reap the most benefits, add your strength training to your high-intensity interval training (like a boot camp class), she says. ●

PROFESSIONAL TRIATHLETE SARAH PIAMPIANO AFTER PLACING FIRST IN THE WOMEN'S DIVISION OF THE 2019 IRONMAN FLORIANÓPOLIS

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THE ATHLETE'S DIET DIFFERENCE

When it comes to seriously fueling your body for a major race or recovering from a workout injury, some traditional diet rules may not apply, while some are more important than ever.

BY EMILY JOSHU

The starting line of Sarah Piampiano's path to the Ironman World Championships was drawn from three things: a friendly bet, a couple of drinks and an underlying, lifelong competitive streak. Formerly a nationally ranked runner and skier throughout high school and college, she abandoned competitive sports after moving to New York City and embarking upon a career on Wall Street. Between the long hours and the mounting stress, Piampiano traded workouts for cigarettes and competition for partying, leading to an increasingly destructive lifestyle. That is, until 2009, when her former college friend signed up for a triathlon. "We were out having drinks one night, and one thing led to another, and we ended up betting on who could beat the other person at this triathlon," Piampiano says. "So I went and I did it." Not only did she beat her friend, but that spontaneous wager reignited her appetite for fitness, competition and healthy living. She quit smoking almost immediately, and over time began breaking up her workdays with training. Within months, she won her first triathlon, and by 2011, she had left Wall Street for the raceways and waters of California. "It legitimately was this life-changing experience for me," Piampiano says. "I think it just gave me a taste of what competition was like again, and I remembered how much I loved it."

Since turning pro in 2012, Piampiano has started The Habit Project—an online community dedicated to inspiring healthy habits—and made her own habit out of winning. She has occupied the top podium position at the Ironman 70.3 New Orleans three times, claimed the title of Ironman Western Australia 2015 and is a two-time top-10 finisher at the Ironman World Championship, in 2015 and 2016.

But she didn't get there alone. Working alongside Scott Tindal, a performance sports nutritionist for the Toronto Maple Leafs, Piampiano learned how to use a different kind of fuel: food, something many elite athletes struggle to manage. "They're not fueling properly, whether it's getting up early in the morning and running or going to the gym and not eating and sometimes not even drinking water," says Barbara Lewin, R.D.N., C.S.S.D., a sports nutritionist and the owner of sports-nutritionist.com. These practices of fueling for energy apply to an elite class of athletes, or those competing in their chosen sport professionally, such as in high-stakes competitions like the Ironman World Championship or the Olympics.

FOR PIAMPIANO, FUELING PROPERLY MEANS eating anywhere from 2,000 to 4,000 calories per day in the moments of calm between running, swimming and biking. And over the two days leading up to a race, carbohydrates are the star player. "Every single meal that I eat has a pretty high level of carbohydrates," she says. Carbs, broken down into glucose and concentrated in the storage molecule glycogen, are crucial for glycogen training, or making your body hold more glycogen than it did before. "That's going to be really effective for long-term endurance activities," says Alexandra Caspero, R.D., the owner of the nutrition practice Delish Knowledge in St. Louis, Missouri.

Simple carbohydrates—sugars—should be reserved for fueling performance before, during and after intense exercise.

Generally, the American College of Sports Medicine recommends that the majority of carbohydrates in a healthy diet be derived from a mix of whole grains, vegetables, fruits, nuts and seeds. Meanwhile, simple carbohydrates—sugars—should be reserved for fueling performance before, during and after intense exercise. Additionally, a 2018 review in *Science* stated that "carbohydrates are the predominant and critical substrate for working muscles."

Piampiano's carb-packed plates before a race often feature foods like gluten-free waffles or pancakes, eggs and toast with almond butter for breakfast, and grilled chicken with rice or sweet potato for lunch and dinner. The day before a race, however, is splurge time—kind of. Piampiano indulges in one or both of her two favorite treats—french fries and ice cream—while balancing the extra sugar and fat with carbs from fruit or a protein shake.

There are not just pre-race rewards but additional sources of fuel. The night before an intense day of training or a big race, Piampiano needs every last calorie to stay energized. Though she cooks her own meals most nights, on a rare night out, she focuses more on enjoying the eating experience than on sticking to her normal plan. Enter french fries and dessert. "It's important to indulge those guilty pleasures but also doing it in a mindful way and not making it somewhere where it's so forbidden that it ends up not being a healthy thing overall," Piampiano says. "For me, they're just additions to my overall diet."

On the morning of the race, Piampiano's breakfast is less variety-driven and follows an exact pattern: three eggs, two pieces of toast with almond butter and a bowl of salted fruit to make up for the sweating and sodium loss that await. To prepare for exercise as grueling as an Ironman, Lewin recommends a hearty breakfast that balances carbohydrates and protein with small amounts of fiber and fat. "It needs to be something that's very digestible," she says.

Competitors can usually count on some in-the-moment adrenaline when focused on passing the racer ahead of them, or on setting a personal best time. But that adrenaline isn't enough to go on without proper fueling. Before a marathon, for example, just snacking on a banana and peanut butter likely won't keep you energized until you reach the finish line, Caspero says. "That works for some people, but for others, they're going to need to make sure they're energizing during the workout," she says. This is essential both for training and at the event itself.

So even on the bike, balancing a snack on the handlebars, Piampiano is fueling. "I don't do well with just eating breakfast, lunch and dinner," she says. On average, she consumes about 350 calories per hour while racing to the finish line, which, for example, could equal one homemade rice cake per hour. "The idea is you want to consume most of your calories

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BE SURE TO PICK A MIX THAT CONTAINS MORE OF THE GOOD STUFF LIKE NUTS, SEEDS, DRIED FRUITS AND WHOLE-GRAIN CEREALS.

when you're most active. That sounds so simple and so straightforward, and yet most people don't do that," Lewin says. "[An athlete's] perceived exertion is really low, and their perception of fatigue is really high." Without enough nutrients and calories, energy levels slump.

After crossing the finish line and taking a moment to catch her breath, Piampiano switches focus. Rather than carbohydrates, her post-race meals are all about protein for recovery and muscle repair through muscle protein synthesis. Due to its amino acid composition, protein is crucial for building and repairing cells in muscles that become damaged by exercise. Additionally, after extended periods of moderate-to-high-intensity activity, protein-produced energy is needed for muscle contraction. Lewin recommends getting that nutrition within 20 to 30 minutes of working out, especially

when you're focused on building muscle. "You're replacing your muscle glycogen stores, and you're helping your body to rebuild your muscle, and in the case of someone wanting to build more muscle, recovery nutrition is huge," she says.

THE IRONMAN CHAMPION NEEDS MORE PROTEIN to repair and build muscle than what Caspero calls a typical "weekend warrior." This ranges from 0.54 to 0.9 gram of protein per pound of body weight daily, according to the Academy of Nutrition and Dietetics and the American College of Sports Medicine's joint guidelines on nutrition and athletic performance. Many athletes, however, still eat far too much of it. "When we think of muscle, we just think of protein, and that's only part of the equation," Caspero says. Though muscle is built from protein, solely eating protein without balancing it with other essential nutrients like carbohydrates doesn't mean you'll bulk up—if you do, it will be fat rather than muscle. Caspero says that if just eating protein built muscle, no one would ever work out.

"Every athlete is unique. Nutrition needs to be individualized not only to the sport but to the individual."

But if someone is focused more on lifting weights than on hitting the treadmill, Christine Rosenbloom, Ph.D., R.D.N., a sports dietitian and the author of *Food & Fitness After 50*, recommends getting protein within an hour of working out. "Look more for quality carbs and look for carb-protein combinations that can fuel your muscles and then provide the muscles what they need to get stimulated and rebuild after exercise," she says. And meat isn't the only option; a 2019 review in *Nutrients* found that plant-based diets helped improve athletes' heart health, performance and recovery, with foods like fruits, vegetables, beans and whole grains providing high amounts of vitamins and fiber.

Rosenbloom encourages female athletes like Piampiano to look beyond calorie count, which varies drastically based on gender and sport. While Piampiano can reach 4,000 calories in a day, a male hockey player, for example, may need up to 7,000 calories. "I always encourage female athletes to look at the nutrients they're consuming, not just the calorie part," Rosenbloom says. "Sometimes they focus so much on body composition or a number on the scale that they don't think about the nutrients that they're putting into their body."

BUT EVEN A COLORFUL, BALANCED PLATE OF superfoods cannot cure the occasional injury thrown into a training regimen. While the exact remedy for recovery depends on the injury—a brutal ACL tear vastly differs from nagging shin splints or reconstructive surgery—your diet has to slow down along with the training. "It's about realizing [athletes] don't need as much energy as they used to and cutting down their overall calories and overall energy intake," Caspero says. While most energy-boosting diets for race-day prep require high-carbohydrate, low-protein combinations, nursing an injury employs the opposite strategy. "When injured, it is a good idea to cut back on carbohydrate and fat intake and keep protein at a healthy level to support healing," Rosenbloom says. For Piampiano, this means cutting her carbohydrate load down from 200 to 500 grams to about 150, protein from 120 to 140 grams to about 80 and fat from 80 grams to 50 to 60.

Whether you're training, gearing up for race day or nursing an injury, fueling for fitness is hardly one size fits all. Three competitors standing alongside one another on a podium will all have their own favorite food fixes. "Every athlete is unique. Nutrition needs to be individualized not only to the sport but to the individual," Lewin says. "Your best health translates into your best performance."

Ten years after her first race day, Piampiano is still learning and improving, athletically and nutritionally. Over the years, her pre-race diet has evolved with her rankings and self-perception. "It's been such a learning curve from a nutritional standpoint, and it's given me such an awareness of what healthy eating is really all about and what fueling yourself and what treating your body right means," she says. More than ever, Piampiano still has the competitive streak that lured her into racing in the first place—even if her toughest competition at times is herself. "I get, in life, a lot of pleasure out of just trying to push the limits of what is possible," she says. ●

Drink Up!

Staying hydrated isn't just for athletes. Water makes up about 60 percent of our bodies, so drinking enough fluids keeps everything functioning from head to toe. Here are three new sipping "rules" to follow when working out.

By Karen Asp

CHILL BEFORE YOU SWEAT. If you're looking to set a new record in that 10K or sprint triathlon, slurp an ice slurry, essentially an unflavored snow cone, 45 minutes before your event. When runners did this prior to a 10K in 82-degree weather, they ran 15 seconds faster on average, per a study published in the *International Journal of Sports Medicine*. "The ice slurry increased body heat storage capacity, which allowed runners to push harder," says Jason Kai Wei Lee, Ph.D., the study's principal investigator from the Defence Medical & Environmental Research Institute, DFO Laboratories, in Singapore.

SAY CHEERS WITH BEER. Good news if you're planning to hit up a brewpub post-hike. In one study, men who rehydrated after a treadmill run with beer (22 ounces, 4.5 percent alcohol by volume), followed by unlimited water, were just as hydrated as men who drank the same amount of liquid but only water. "Drinking beer, as long as it's in moderation, doesn't impair hydration or hinder your recovery," says Manuel J. Castillo, M.D., Ph.D., a study co-author and a professor of medical physiology at the University of Granada. Beer, after all, is 95 percent water. So go ahead and order a beer to quench your thirst. Just make sure to ask for water as well.

FUEL UP WITH SALT. A little extra salt before your next workout may actually help keep dehydration at bay, according to a study from the *International Journal of Sport Nutrition and Exercise Metabolism*. When male cyclists ate chicken noodle soup (with almost 1,400 mg of sodium) 45 minutes before exercising in the heat, they drank—and retained—more water during their ride than cyclists who pre-fueled with water alone. Physical performance did not differ between groups. "Sodium may help encourage you to drink more," says Kelly Pritchett, Ph.D., R.D., an assistant professor in nutrition and exercise science at Central Washington University, especially if you're exercising for more than an hour or at a high intensity in the summer heat. A handful of pretzels or a sports drink with sodium will get the job done.

Snacks for Every Workout

What should I sip during Spin class? Do I need protein before a long run? Confusion, cleared: Sports-nutrition pros reveal how to snack smarter to get the most out of that sweat session.

BY LINDSEY MURRAY

Whether you're eating for endurance or snacking for strength training, it's not always clear what is best to put into your body. Moreover, "what's healthy on a regular basis is not necessarily a good choice for the race course or even for a workout," explains Barbara Lewin, R.D., a sports nutritionist who works with professional athletes. No need to worry: follow these expert guidelines on how to build and time snacks and you'll power through with high-octane energy.

CARDIO. If you're tackling intense, strenuous aerobic exercise, such as high-intensity interval training, when you eat is just as key as what you eat. Choose a pre-workout meal that's low in fat and sugar, moderate in protein and high in carbs, like a smoothie made with almond milk, a banana and berries. Have it 60 to 90 minutes before your workout: "The meal should be digested to provide fuel to the working muscles," says Lewin. "The last thing you want is to step onto the treadmill with a full stomach." If your cardio session is less than an hour long, you don't need to snack again during, notes Abby Langer, R.D., a dietitian in Toronto and the owner of Abby Langer Nutrition.

RECOVER FROM IT. After your workout, your body has a 20- to 30-minute "metabolic window," when your muscles absorb nutrients most efficiently. It's important to replenish during this time frame so your body maintains its energy supply. Prioritize carbs and protein, advises New York City nutritionist Leah Kaufman, R.D.: "A snack with this combination will help aid muscle recovery and reduce soreness." Opt for something small, like a cup of chocolate milk; one study found that cyclists shaved an average of six minutes off their ride time when they drank low-fat chocolate milk after training, as opposed to sports drinks and zero-calorie beverages. Within an hour, you want protein and electrolytes; try a protein smoothie made with coconut water, suggests Kaufman.

PREPPING FOR A RACE. Training for a 5K, 10K or marathon? Practice your race menu. "Eating exactly what you plan to have on the day of the race will be beneficial in seeing how it affects your energy and stomach," says Kaufman. The night before race day or a hard run, Langer suggests grabbing a meal that's lower in fiber and fat but high in carbs—so, yes, pasta works, but you don't have to carbo-load with a vat of spaghetti. The morning of, have a small, carb-filled breakfast, like a white bagel (you read that right!) with almond butter and a banana.

If your race time is under an hour, you shouldn't need to worry about drinking while you're running. For longer events, Langer recommends downing 3 to 6 ounces of fluid every 20 minutes and 30 to 60 grams of carbs every hour; energy gels are convenient on the go.

A general rule is to drink 16 ounces of fluid for every pound you sweat off during your run (you can tell by weighing yourself right before and after). For more intense weeks of training, Lewin advises drinking 4 ounces of tart cherry juice twice a day to help with recovery and reduce muscle damage and inflammation. Research confirms that cherry juice is a smart move: in a small study published by the American College of Sports Medicine, trained athletes who drank it twice daily for a week before and two days after intense strength training returned to 90 percent of their normal muscle force in 24 hours, compared with only 85 percent when they didn't drink it.

STRENGTH TRAINING. Eat a balanced meal with carbs and protein an hour or two before you hit the weights—and have plenty of liquids on hand for the workout. Carbs help prevent muscle breakdown and fatigue, while protein helps regulate growth and repair, says Marie Spano, R.D., a sports nutritionist for the Atlanta Hawks. Stick to water for sessions under an hour; choose a sports drink if you're lifting for longer. "The carbs in the sports drink will give you extra energy," explains Spano.

Protein holds the healing power your body needs now, says Kaufman: "Our muscles undergo tears and stress that can be repaired only by the amino acids in protein." Sip a water- or almond-milk-based whey protein shake containing 20 to 25 grams of protein within an hour. If you prefer a solid source of fuel, have a protein bar. Look for brands that pack in 20 grams of protein per bar. ●

Snack Attack!

Take a break from the usual chips or popcorn and try these fun, healthy and satisfying snack swaps.

Radish & Goat Cheese
2 Tbsp. herbed soft goat cheese + 1 sliced radish + 2 tsp. microgreens + ¼ tsp. lemon zest

Spinach & Egg
½ cup cooked baby spinach + 1 large cooked egg + ½ tsp. sliced chives + ½ tsp. hot sauce

Apple & Smoked Gouda
2 Tbsp. shredded smoked Gouda + 4 apple slices + 1 tsp. toasted coconut + ½ tsp. maple syrup + ⅛ tsp. flaky sea salt

Raspberry & Cream Cheese
1½ Tbsp. reduced-fat cream cheese • 1½ tsp. mashed thawed frozen raspberries • 2 tsp. toasted chopped hazelnuts • 2 tsp. honey

How to Make Sweet Potato Toast
Cut ¼-inch-thick slices from the center of the potato. Toast until tender and starting to brown, 12 to 15 minutes.

Chocolate & Banana
1 Tbsp. chocolate-hazelnut spread • 2 banana slices • 1 tsp. crispy brown rice cereal

Tuna & Avocado
¼ ripe avocado (mashed) • 1 Tbsp. julienned carrot • 1 tsp. chopped pickled ginger • 1 Tbsp. oil-packed tuna • ¼ tsp. slivered nori • ¼ tsp. toasted sesame seeds

1 Crispy Curried Chickpeas

Rinse one 15-oz. can **chickpeas;** thoroughly pat dry. Toss with 1 Tbsp. each **extra-virgin olive oil** and **curry powder** and ¼ tsp. **salt.** Spread on a rimmed baking sheet. Bake in upper third of oven at 400°F, stirring twice, until browned, 30 to 35 minutes. Let cool on the pan for 30 minutes. If stored longer than 4 hours, recrisp at 400° for 5 to 10 minutes, if desired.
SERVES 4: ¼ cup each

2 Hummus-Stuffed Mini Bells

Combine ½ cup **hummus** with 1 Tbsp. chopped **Kalamata olives.** Stuff 8 cored **mini bell peppers** with 1 Tbsp. each of the olive hummus. Refrigerate for up to 1 day.
SERVES 4: 2 peppers each

3 Fruit & Nut Popcorn Trail Mix

Combine 1 cup **air-popped popcorn,** 2 Tbsp. **salted shelled pistachios** and 1 Tbsp. **dried cherries.** Store airtight for up to 1 day.
SERVES 1: 1¼ cups

4 Mango-Date Energy Bites

Combine 1 cup each **unsweetened dried mango** (or other dried fruit), **pitted whole dates** and **raw cashews** and ¼ tsp. **salt** in a food processor; process until finely chopped. Form into about 20 balls, using 2 Tbsp. each. Store airtight at room temperature or refrigerate for up to 1 week.
SERVES 20: 1 ball each

5 Smoked Salmon Maki Roll

Arrange 1 oz. smoked salmon, ¼ sliced avocado, ¼ cup shredded carrot and 4 thin strips cucumber across the bottom third of 1 sheet toasted nori seaweed. Roll up tightly, wetting the last inch to seal the roll. Cut into 8 pieces. Refrigerate for up to 1 day.
SERVES 1: 1 roll

Peanut Butter, Blueberry & Oat Energy Squares

ACTIVE: 10 min
TOTAL: 1 hr 10 min
TO MAKE AHEAD: Store airtight at room temperature for up to 3 days or refrigerate for up to 1 week.
EQUIPMENT: Parchment paper

- **1 cup creamy natural peanut butter**
- **½ cup pure maple syrup**
- **2 cups rolled oats, toasted**
- **½ cup dried blueberries**
- **½ cup chopped pistachios**
- **½ teaspoon salt**

1. Line an 8-inch-square baking pan with parchment paper, leaving extra hanging over two sides. Lightly coat the parchment with cooking spray.

2. Mix peanut butter and maple syrup in a large bowl. Stir in oats, blueberries, pistachios and salt. Spread the mixture firmly and evenly into the prepared pan. Refrigerate until cold, about 1 hour. Cut into 16 squares.

SERVES 16: 1 square each
CAL 206 / **FAT** 11G (SAT 2G) / **CHOL** 0MG / **CARBS** 22G / **TOTAL SUGARS** 10G (ADDED 9G) / **PROTEIN** 6G / **FIBER** 3G / **SODIUM** 127MG / **POTASSIUM** 108MG

CHAPTER 3

Everyday Energy

A balanced breakfast, a good night's sleep and even the morning sunshine matter when it comes to beating fatigue all day long.

THE MOST IMPORTANT MEAL OF THE DAY?

Conventional wisdom has long considered breakfast necessary to jump-start your day. Here's what the research says and how to make sure you make the most of your morning meal.

BY RICHARD JEROME

As a boy, I was an addict, hopelessly hooked on breakfast cereal. Every morning, usually hunched over the massive MacMillan *Baseball Encyclopedia,* I would do my bit for the good shareholders of General Mills and Quaker Oats, shoveling in Cheerios (piled with sugar), Lucky Charms, Cap'n Crunch and my favorite, Life—which I first let soak in the milk till each oaty square turned soft. On weekends and languid summer days, freed from the time pressure of getting to school, I might consume a half-dozen bowls at a sitting, while just as ravenously devouring 2,338 pages of baseball statistics dating back to 1876.

Once I morphed into adulthood (more or less), however, the cereal habit faded; after landing my first New York magazine job, I formed a new a.m. ritual, grabbing a bulky, buttery scone from a little place on Bleecker Street, around the corner from the office. Eventually, a hectic commute and other stressors muffled my appetite to the point where I skipped morning meals entirely, save for a cup—or three—of coffee. Today I honestly can't remember the last time I had breakfast—though under duress, I'd guess it was sometime in the early '90s.

Have I been missing something—perhaps even harming myself? A raft of studies suggests that breakfast provides a crucial energy boost to jump-start the day. "After a long night's fast, it is the first source of energy we need to go about our cognitive or physical activities," wrote the authors of a sweeping survey of nutritional research published in the *Italian Journal of Pediatrics* in 2013. Moreover, after reviewing 45 studies dating back to 1950, the Italian team found ample evidence that "breakfast consumption has a positive effect on

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ONE LARGE EGG HAS 6 GRAMS OF PROTEIN. COMPARED TO CARBOHYDRATES AND FAT, PROTEIN KEEPS YOU SATISFIED LONGER.

A HEALTHY YOGURT BOWL COMBINES FRESH FRUIT, GREEK YOGURT AND CRUNCHY GRANOLA FOR AN EASY BREAKFAST.

cognitive performance, in particular on memory and attention span."

BREAKFAST'S ENERGIZING POWER DERIVES FROM its role in replenishing glucose, a simple sugar that serves as the body's energy source and is broken down and absorbed from the carbohydrates we eat. The body uses up as much glucose as it can during the course of the day; then it converts simple glucose units into a more complex sugar called glycogen. The glycogen is then stored in muscle tissue and the liver, where it is gradually released while we sleep to help stabilize blood-sugar levels. When we awaken in the morning, perhaps having gone without food for as long as 12 hours, our glycogen levels are pretty well depleted; a healthy breakfast restores those glycogen stores—and hence provides that needed burst of energy.

Aside from energy renewal, breakfast is widely thought to offer other quality-of-life benefits. Considerable research has suggested that a morning meal could promote weight loss. "Having breakfast, especially a healthy breakfast with plenty of protein and other nutrients, is linked to greater fullness, fewer cravings and even reduced nighttime snacking," says Torey Armul, R.D., a spokesperson for the American Academy of Nutrition and Dietetics. There isn't universal agreement on that score, however—for instance, other studies suggest that eating breakfast makes little difference when it comes to weight loss or that it may even add to your daily calorie intake. Still other research falls somewhere in the middle—leaving consumers in a muddle.

For an illustration of how confusingly complex research on breakfast can be, consider a study published in the *Journal of American Cardiology* in April 2019. A team from the University of Iowa surveyed 6,550 Americans from ages 40 to 75 between 1988 and 1994 and concluded that skipping breakfast was associated with a significantly higher risk of eventually dying from cardiovascular disease—especially stroke. But the data didn't specify what food or drinks the breakfast eaters consumed. What's more, the people who skipped breakfast also had less-healthy lifestyles—many were ex-smokers or heavy drinkers who led sedentary lives; their overall diet was poor in quality, perhaps in part because they tended to have low family incomes. In other words, it's difficult to know whether the subjects' heightened susceptibility to strokes and heart attacks was directly linked to their skipping breakfast—or to any or all of these other factors.

SO HOW CRUCIAL IS BREAKFAST? "THERE ARE LOTS of different schools of thought on this but very little research to say that breakfast is more important than any other meal of the day," notes nutritional therapist Clemmie Macpherson, founder of London's Nutrition and Lifestyle Medicine Clinic. "What we should be focusing on is what we are eating for breakfast," especially if we want to maximize the meal's energy-stoking potential. "Having a balanced breakfast is important—so that means some protein, healthy fats and complex carbohydrates to provide us with all the nutrients and energy we need to keep us full until our next meal. Including a portion or two of fruit and vegetables with breakfast is a great way to start the day, as these provide vital nutrients."

Breakfast's energizing power derives from its role in replenishing glucose, a simple sugar that serves as the body's energy source.

Macpherson cautions against breakfast foods that may offer a deceptively quick energy rush. "Many of the popular breakfast cereals are very high in sugar and low in nutrients and fiber," she explains. (The once-trendy practice of juicing also drains fruits and veggies of helpful fiber.) "If we are consuming a substantial bowl of sugary cereal or granola that lacks nutrients," Macpherson adds, "it may spike our energy levels, which may lead to crashes later that leave us tired, shaky, 'hangry' and craving more sugary foods to pick our blood-sugar levels back up again. This can lead to a vicious cycle, often aptly referred to as the blood-sugar roller coaster: rapidly increasing then decreasing levels, which can play havoc with our energy, mood and concentration. On the other hand, having a substantial, nutritious breakfast that provides our body with the nutrients it needs may help keep us full and sustain our energy levels for longer—meaning we may be less likely to overconsume later in the day. Research shows that those who eat breakfast don't necessarily eat less during the day, but in my

clinical experience, having a nutritious breakfast rather than a sugar-laden one often helps to support healthier choices and reduces overconsumption later in the day."

Does that mean breakfast is all good, then—as long as we eat wisely and don't go too heavy on the sugar? Actually, some scientists are downright anti-breakfast—and at the far end of that spectrum is Terence Kealey, an Oxford-educated physician, metabolic biochemist and former vice-chancellor of the University of Buckingham in England. After experiencing a personal health crisis—much to his surprise, the trim, fit Kealey was diagnosed with type 2 diabetes at age 60—he undertook his own nutritional research. The result was a controversial 2016 book, *Breakfast Is a Dangerous Meal*, in which Kealey marshals a range of studies to argue that most people should simply skip their morning repast. "The evidence I found was overwhelming that if you just eat lunch and dinner and for 16 hours you're fasting, that's a very healthy lifestyle," says Kealey. He acknowledges that skipping breakfast isn't for everybody—for example, "children and fit, healthy young adults" who exercise or train vigorously. "But most of us are over 40—that's just the nature of today's demographic—and lead very sedentary lives. These people should absolutely not be eating breakfast."

"A breakfast that provides our body with the nutrients it needs may help keep us full and sustain our energy levels for longer."

Nevertheless, for many of us—and perhaps most—breakfast is simply assumed, like the sunrise. But it wasn't always that way. In medieval Europe, for example, breakfast was consigned primarily to the elderly and infirm, as well as to hard laborers, who ate a light morning snack—typically a few bites of bread and cheese, washed down with ale—to help power them through a long, back-breaking workday. In general, however, fasting till what we'd consider lunchtime was seen as admirably pious. In his *Summa Theologica*, the 13th-century theologian and philosopher Thomas Aquinas went so far as to say that to eat too early in the day—and literally break the fast—was perilously close to the deadly sin of gluttony.

BREAKFAST BECAME MORE INSTITUTIONALIZED, at least for lower socioeconomic classes, with the advent of regular working hours. In England, for example, the Act of 1515 mandated that craftsmen and other laborers start their workday at 5 a.m. and continue to 7 or 8 p.m., with a half-hour for breakfast and 90 minutes for lunch. Increasingly, Europeans saw breakfast as essential to well-being. In his 1584 book *The Haven of Health*, Thomas Cogan, a schoolmaster from Manchester, England, cautioned against skipping breakfast, arguing that to "suffer hunger long filleth the stomach with ill humours." At that juncture the great mass of people ate breakfast gruels based on oats, rice and other cereals; the wealthy and noble woke up to eggs and meat.

Nothing enshrined breakfast in the West more than the Industrial Revolution of the 18th and 19th centuries. In theory, a hearty morning meal allowed the burgeoning class of factory laborers to work longer hours without interruption; in time, it became standard practice to eat breakfast before work. Even among the Victorian middle and upper classes, breakfast became a staple—and as much a social event as a nutritional necessity, a chance for the family to assemble before they each fanned out for their daily routines. For the particularly well-heeled, these meals could be mini feasts, featuring eggs, pastries, pancakes, chicken and beef.

Over the past century or so, if you said "breakfast food" to an American, the first dishes to spring to mind might be cereal or bacon and eggs. How did they become the morning's go-to grub? Canny marketing. In the late 19th century, Dr. John Harvey Kellogg, a physician and nutrition advocate who ran a sanitarium in Battle Creek, Michigan, developed the first widely popular breakfast cereals. The first, a baked, doughy mixture of wheat, oats and corn, he dubbed Granola; the second was called Corn Flakes. Kellogg saw his cereals as a boon for physical and spiritual health.

As other manufacturers hawked their own brands, they also pushed the health angle—for instance, Kellogg's chief competitor, Charles William "C.W." Post, claimed that his own cereal line cured malaria, appendicitis and other maladies. In 1922 the accidental spill of some wheat bran mixture on a Minnesota stove created Wheaties, eventually manufactured by General Mills. In 1934

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KALE AND AVOCADO ARE GREAT ADDITIONS TO A VIBRANT GREEN SMOOTHIE.

Lou Gehrig became the first in a long line of star athletes to appear on a Wheaties box—the General Mills cereal is still plugged as the "Breakfast of Champions."

Bacon, meanwhile, also earned its breakfast cred through advertising—orchestrated by the legendary public relations pioneer Edward Bernays, a nephew of Sigmund Freud. In the 1920s, Bernays persuaded 5,000 physicians to sign a letter recommending bacon and eggs as an ideally healthy breakfast.

FOR DECADES THEREAFTER, A CONSIDERABLE amount of research argued in favor of a hearty breakfast, but at least some of those studies may warrant healthy skepticism. "The data are often interpreted in a way that suits the cereal and bacon companies that sponsor the research and give grants to universities," Kealey says. For example, he points out, some results suggest that people who skip breakfast tend to be heavier. The question is whether they are heavier because they skip breakfast—or for other reasons. "What we have is a marked socioeconomic phenomenon," Kealey says. "People of lower socioeconomic groups lead chaotic lives—they just do, throughout the Western world. And as a result, they tend to skip breakfast, while comfortable, structured middle- and upper-class people tend to eat breakfast. People of lower economic groups also get less exercise and eat unbelievably unhealthy processed fast food and far too much of it. So [there's] an association between social classes and skipping breakfast, but also an association between being in a lower socioeconomic group and being obese."

"I recommend at least 20 grams of protein at breakfast," says Torey Armul, R.D. "Two or three eggs in an omelet or scrambled eggs."

Indeed, conventional wisdom long held that eating breakfast can help keep your weight down—the reasoning was that a morning meal should fill you up sufficiently to curb your appetite the rest of the day. But in January 2019 the *British Medical Journal* published a review of 13 randomized controlled trials and determined that there is "no evidence to support the notion that breakfast consumption promotes weight loss or that skipping breakfast leads to weight gain." In fact, people who ate breakfast actually consumed 260 more calories a day than those who did not.

It hasn't helped matters that for years we were advised that in order to stay slim and healthy we should avoid fats and consume carbohydrates. Recent studies show that quite the opposite is true—yet many breakfast eaters still load up on refined carbs. "I'll go to a hotel and see everyone eating waffles and toast and English muffins, and I think, 'This isn't breakfast. This is dessert,'" Kealey says. "And it's incredibly bad for you. If you're one of those people who just has to eat breakfast—and there are people like that—then you should eat protein."

PROTEIN IS AN INVALUABLE ENERGY PROVIDER IF you want to launch your day with breakfast. Protein takes longer than carbs to break down in the body, providing a longer-lasting energy source. "I recommend at least 20 grams of protein at breakfast," Armul says. "Two or three eggs in an omelet or scrambled eggs, homemade smoothies—you can add peanut butter, milk, Greek yogurt, protein powder . . . oatmeal . . . nuts. Fiber—fruits and vegetables, whole grains, oatmeal, wheat toast—is very important for weight control and digestive health. Healthy fats slow down the digestion of carbs, so you're feeling full, and also reduces blood-sugar spikes. Have some avocado or nuts, add some cheese, splash on some olive oil." Alissa Rumsey, a nutritional therapist and the founder of Alissa Rumsey Nutrition and Wellness in Manhattan, agrees that "a combination of fat, protein and carbohydrate will typically help you stay full and satisfied for longer."

As for someone like me, who has skipped breakfast for 25 years, it probably doesn't hurt—and may actually help—as long as I eat wisely and replenish my energy supply later in the day. "Breakfast can be a great way to get in some nutrients and fuel to start the day, but some people just aren't hungry in the morning," Rumsey says. "You're not necessarily missing out on anything by not eating breakfast. That may just be how your body optimally functions. If you're listening to your body, eating when you are hungry and eating enough throughout the rest of the day, you're probably OK." ●

Rise and Shine

If you're not wired to feel energized in the morning—but you dream of doing just that—we've got some advice.

By Arielle R. Franklin

If the early bird catches the worm, what does the night owl get? Pressure to wake up sooner and a big old guilt trip for hitting snooze, says Fiona Barwick, Ph.D., a clinical assistant professor at the Stanford Center for Sleep Sciences and Medicine. "As a society, we have come to believe that a person is weak or lazy if they aren't awake and alert early," she says. Yet research shows that each of us has a genetic chronotype that plays a role in when we wake and sleep. Some of us are biologically inclined to perform best in the morning (these people are called "larks"), and some are more active after dark.

In an ideal world, you could adjust your schedule to suit your body's natural preferences. "Both larks and owls can have sleep schedules that leave them rested and productive," says David Neubauer, M.D., an associate director of the Johns Hopkins Sleep Disorders Center. The good news for night people: genetics aren't everything. Experts share how anyone—yep, even those of us who watch TV into the wee hours—can reprogram both body and mind to wake up early more naturally and to function better all morning long.

DREAM UP A MAGICAL MORNING. Changing habits can be easier if you identify an intention to get up earlier, says Rafael Pelayo, M.D., a clinical professor at the Stanford Center for Sleep Sciences and Medicine. Do you love cuddling up with a good book? Do you want to linger over breakfast? Whatever you desire (within reason), make it your motivation to wake up. "The thing you do as soon as you get out of bed cannot be something you view as a chore," he says. "If you do not like doing it, you will not want to deal with it, and you'll likely fail to reach your goal." In other words, if you tend to dread exercise, a 6:30 a.m. yoga session may not be a great plan. Save the workout for later and start your day with something you enjoy.

GET THE FIRST FIVE MINUTES OF THE DAY RIGHT. Even if the sun isn't up yet, expose yourself to as much light as possible. "Morning light has a stimulating biological effect even when your eyes are closed," says Dr. Neubauer. It's how our internal clock knows it's time to start the day. So ditch the blackout shades and get sheer curtains instead. It's critical to get out of bed as soon as your alarm sounds, says Sabra Abbott, M.D., a neurologist and sleep medicine physician.

EASE INTO IT. When it comes to adjusting your internal clock, slow and steady is the name of the game. "If you typically get up at 9 a.m., don't expect to wake up at 6 after two days," says Dr. Abbott. "That's against the natural capabilities of your body." Instead, gradually inch toward your ideal start time by going to bed and waking up 15 minutes earlier than usual. Move the time back by 15 minutes every two days until you're where you want to be. Don't mess with the total number of hours you aim for each night. Most of us need around eight hours of rest.

THE STORY BEHIND YOUR EGGS

These protein-packed breakfast staples are energy superfoods, and more consumers are buying cage-free eggs to be more humane. But is this huge change in how the United States produces eggs all it's cracked up to be?

BY RACHAEL MOELLER GORMAN

It's 5:30 a.m., and the fluorescent lights inside the Midwestern chicken house flicker on. The hen in cage 405 wakes to the whir of ventilation fans and a slight scent of ammonia, wing-to-wing with five other hens in a microwave-oven-sized enclosure. The feed belt in front of her pen starts rolling past, so she sticks her head through the bars and pecks the soy-and-corn mixture. She is 19 weeks old and has just arrived from the pullet- (young hen) raising facility. But now she is ready to lay her first egg.

Hens prefer some privacy when laying, but since there is no nest or secluded area in which to sit, the Lohmann LSL white hen just deposits her egg on the wire floor of the cage. It rolls down a 6-degree slope to a conveyor belt. The egg eventually joins others from the 10 rows of cages stacked eight high that run the extent of the house—about the length of two 747 planes resting nose to tail. Eggs from all 200,000 hens steadily proceed to the end of the house, where they are washed, sanitized with a light chlorine solution, visually inspected and graded by weight. The eggs are mechanically placed in cartons and dispatched in refrigerated trucks to grocery stores.

The rest of the day, the hen stands in her cage. She fiddles with her feed belt. She sips at her water nipple. She poops through the wire floor onto another belt, a manure belt that removes the waste out of the house to a storage area. She can't move or spread her wings very much. She can't dust-bathe to work dirt through her feathers, which she often feels the urge to do. She can't perch up high to avoid predators, real or imagined.

Every day is the same, and as the weeks go by, her bones grow brittle because she can't move

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STUDIES SHOW THAT EGGS FROM HENS RAISED ON PASTURE HAVE TWICE THE VITAMIN E AND HEART-HEALTHY OMEGA-3 FATS, SUCH AS EPA AND DHA, AS WELL AS MORE BETA CAROTENE.

around. Her feathers rub off on the sides of the cage.

Still, she survives, maybe longer than in the wild with predators or diseases. At 78 weeks old, when her eggshells grow thin, she is sacrificed—or, as the poultry people put it, the house is "depopulated" (usually becoming food for other animals). Workers then ready the house for another batch of 200,000 hens to lay nutrient-packed eggs to feed Americans at a low price.

Eggs are breakfast superstars. One large egg has 6 grams of protein and 70 calories. Compared with carbohydrates and fat, protein keeps you satisfied longer. Plus, in one study, people who ate eggs for breakfast felt fuller longer and lost more than twice as much weight as those who got the same amount of calories from a bagel for breakfast. The average American eats about 260 eggs a year—whole and as ingredients in foods like mayonnaise and ice cream. And U.S. companies produce about 83 billion whole eggs annually, with "battery cage" farms like this producing about 90 percent of them. But perhaps not for long.

There's a revolution happening in the egg industry. Consumers want eggs from hens that don't live in inhumane-seeming cages. A 2014 poll showed that 62 percent of Californians said they'd be more likely to eat at a restaurant that served only cage-free eggs. The industry listened. Starting in September 2015, a series of the biggest U.S. restaurant chains (like McDonald's) and retail stores (like Walmart) pledged to buy only eggs from cage-free hens in the coming years. Now an estimated 51 million of the country's 300 million egg-laying hens are cage-free, more than double from four years ago. In a few years, you may not be able to find eggs from caged hens at all. And a 2018 survey from the ASPCA found that 70 percent of respondents pay attention to labels that indicate humanely raised meat, dairy and eggs.

This tremendous shift will cost the American egg industry billions of dollars and countless hours and energy. But will it be worth it? What, exactly, is a cage-free hen anyway? Are the chickens really any happier? Or is it just another way to charge a few extra dollars for what is currently one of the cheapest sources of high-quality protein on the planet?

Before World War II, family farmers raised small flocks of hens that pecked at bugs and seeds in the grass and spent their nights in small, backyard henhouses. Then a debilitating disease called coccidiosis, caused by a feces-dwelling parasite, started afflicting the birds. Farmers began lifting the hens off the ground and putting them in cages to protect them. With the cages, farmers realized they had better control of the hens—their diet, manure, temperature and the resulting eggs. As the U.S. population boomed, larger and larger hen-housing systems were built. Today, conventional laying houses each hold some 200,000 caged hens or more.

Joy Mench, Ph.D., an animal scientist at the University of California, Davis, researches ways to improve the welfare of captive animals like hens. She explains that battery cages don't meet a hen's basic behavioral needs.

So what's really important? "A nest," she says. "They like that secluded area to lay their eggs. Perches are very important, particularly because they go up to roost at night." In addition, a scratch pad or an area with dirt or seed, because hens naturally spend a lot of time scratching and foraging, as well as working loose material into their feathers to clean themselves, called dust-bathing. "And, obviously for any animal, not specific to poultry, having freedom to move around is key."

A Day Uncaged

At 10 a.m., in a different henhouse almost as big as the first one but without small battery cages, another hen lays her daily egg in a nest box. It rolls down a slope, as in the caged house, and onto a conveyor belt. She hops out of the box when she's done, pecks at a nipple drinker and then rests on one of seven galvanized steel perches. She shares these perches in her "colony unit"—an 8-by-6-by-8-foot vertical aviary-style enclosure—with 141 other hens; there are six long rows of aviaries totaling 351 units in the henhouse, holding almost 50,000 chickens.

The aviary gates swing open at 11 a.m. (when the farmers figure most eggs have been laid), and the hen hops down to the litter floor with the 851 other chickens from the five other colony units in her pen. She technically has 81 square inches of litter floor to herself (which, added to her aviary space, is double the room that a battery-caged hen has), but many of the hens are still up in the aviaries, and so she has more space to peck around and dust-bathe. Soon,

a bossy type-A hen approaches her. She pecks her hard, until the first hen hops back up on a perch. Some of the other hens lay their eggs in the litter; occasionally, a human worker comes by and gathers them up. These vertical aviary cages are one common type of cage-free system. The USDA defines "cage-free" as simply a facility that provides hens "the freedom to roam within the area during the laying cycle," in addition to unlimited food and water. But there are no space requirements for the hens, no mention of perches in the actual USDA definition and no guidelines for nesting boxes, unless outside groups like the American Humane Association or Humane Farm Animal Care has certified that the facility meets their higher standards. Most cage-free hens never go outside.

When hens are free to move in cage-free settings, pecking order—a real and normal instinct for chickens—expresses itself more fully. Alpha hens peck hens lower on the totem pole when they are all together in one big flock, and some even kill each other. When hens are crowded together in small cages, the natural pecking order tends to be much less severe—that's one major unexpected benefit to cages. In a cage, there are fewer animals to gang up on lower-ranking birds, and the alpha hen doesn't have to continually assert herself.

A 2018 survey found that 70 percent of Americans pay attention to labels indicating humanely raised meat, dairy and eggs.

But when the cage-free movement began, little systematic research had been conducted to determine what would happen with pecking order or whether cage-free systems could even work on a large scale. To address the void, McDonald's led the charge to study cage-free systems. In 2011, it helped form a broad group of stakeholders called the Coalition for a Sustainable Egg Supply (CSES), which included egg producers, poultry scientists, food manufacturers and others. At a single facility in the Midwest, CSES raised and studied flocks of chickens grown in either conventional cages, a cage-free system or so-called enriched cages (cages containing perches, nest boxes and scratch pads for the chickens).

Results, they reported, were mixed. The cage-free system was better for the hens' bone health (their legs were stronger); they could perform many more natural behaviors, such as foraging, dust-bathing, flying and nesting; and they still had a lot of their feathers.

But it seemed cage-free was worse than battery cages for indoor air quality (there was more ammonia and dust) and worker respiratory health, and it was more costly—36 percent higher. Much of this is from a higher payroll due to increased worker tasks like gathering eggs from the floor and from other non-nest-box places where the hens sometimes lay them. Also, pullets raised in aviaries (to accustom them to the system) cost more. In addition, the cage-free hens had more than twice the mortality of conventional hens. In the study, 11.5 percent died compared with 4.7 percent for conventional systems. This mirrors the findings of other studies that found that cage-free and free-range hens often suffer higher mortality rates, says Joy Mench, the UC Davis animal scientist.

Turns out, hens are pretty mean when they have room to be. "The cage-free system gives you a larger repertoire of behaviors," says Ken Anderson, Ph.D., a poultry scientist at North Carolina State University who conducted some of the CSES research. "When you take into account the reality that chickens have a social structure that includes very low-ranking, mid-ranking and high-ranking individuals, the welfare of the overall flock is not enhanced. The low-ranking individuals usually wind up being shorted on nutrients, shorted on space and are the brunt of the aggressive acts within the flock."

The Freest Hens

On a warm Vermont day, the sun pushes through clouds to highlight a few vibrant red maples on a hillside, a little way up from a flock of Bovans Brown hens poking around in a grassy field. A chorus of coos floats up. "We call it singing," says Jesse LaFlamme, CEO of Pete & Gerry's Organic Eggs, the largest producer of cage-free and free-range eggs in the U.S. "It's their birdsong."

Each chicken in the pen does her own thing: one scratches a hole in the dirt, preparing to dust-bathe. Another out in the field pokes at clover and dandelions, searching for bugs and seeds. A hen right

next to the fence stares confidently at visitors, then suddenly turns her head and pecks a wimpier hen that ventures too close. Another hen attempts escape, flapping her wings and rising a few feet. The fence is just too high, so she returns to the grass and resumes her search for seeds.

The inside of the henhouse is different, but not in a jarring way: the chicken noise is squawkier, louder. The air has a slight dustiness to it and smells of manure, but it's not overpowering, and there's no ammonia scent at all. Many more hens spend their time here, inside. There are 19,000 hens total at this free-range facility. If this were a cage facility, there would be upwards of 250,000 in the same space, minus the outside yard. Along the length of the 500-foot-long barn is a scratch area, and down the middle is a long row of curtained nest boxes, with plenty of perch space, feeders and waterers. In the winter, the hens spend most of their time in here.

But not all hens producing organic eggs are raised this way. The USDA requires organic eggs to come from hens that are uncaged, have access to the outdoors, fed an organic diet and never given antibiotics or exposed to synthetic chemicals. But the hens don't necessarily run in a pasture hunting for bugs and seeds. A 2015 Cornucopia Institute report on organic egg farms estimated that 80 percent of organic eggs come from facilities where the hens' only outdoor access areas are small, covered porches that fit just a few chickens at a time.

LaFlamme picks up a hen that has ambled over and strokes her back. "It's pretty simple," he says. "These hens have some basic natural behaviors. Their whole life is to exercise these behaviors. That's all they have." The strong instinct to scratch, to lay an egg in a nest where they feel protected and secluded, to roost, especially at night when they're completely putting their guard down, this is what they do. "We accommodate those behaviors," says LaFlamme. "Anything less is cruelty, in my opinion."

LaFlamme is a big proponent of free-range hens like these, the next step up from cage-free. Yet this is not a hippie, mobile-cage, all-pasture operation that serves a small number of local customers.

Pete & Gerry's is a large, growing business that prioritizes animal well-being: its eggs are all Certified Humane—meeting some tough standards. Pete & Gerry's partners with 120 family farms all across the country; this means, usually, a farm with one or two large henhouses—enough to support a family of four. LaFlamme's own family farm in Monroe, New Hampshire, across the river from this Vermont farm, is one of the original Pete and Gerry's farms, and his family still lives there. Driving along in his older, blue Volkswagen Jetta with two booster seats in the back and the license plate "Cluck-1," he passes his grandfather's old red barns and his mother mowing his lawn.

The CSES and other studies' findings that mortality is higher when chickens are let out of cages flummoxes LaFlamme. "The idea that cage-free might be less humane than cages because of 'high mortality' is often brought up by the larger industry and opinion articles. Given our experience and data, I think the argument is baseless," he says. He has two years of data from 127 free-range and organic flocks that produce Pete & Gerry's eggs, far more chickens than in the CSES reports. Hen mortality: 4.28 percent, which is less than that of conventional cages in the CSES study.

"Hens have a very hierarchical social structure; there are absolutely type-A personalities, many of whom can be aggressive and downright mean. But is the solution really to put hens in small wire cages?" LaFlamme asks. "How about creating a cage-free environment that mitigates the frustration of a naturally aggressive hen, distracts her and occupies her time with natural behaviors instead of aggression toward her flock-mates?"

Josh Balk, the vice president of farm-animal protection at the Humane Society of the U.S. (HSUS), points out that the farmers in the CSES study had never raised hens in a cage-free system before. "It's kind of like me comparing the safety of a motorcycle to a car, but I've never driven a car before," he says. "I get in the car and start bumping curbs and not knowing how to park, and I say, 'Hey, cars are more dangerous than motorcycles.'

Those producers never did cage-free before, and that is a basic flaw of that study, and that's why the very backers of the study still decided to go cage-free." In fact, after the studies were published with mixed findings, McDonald's decided to stick with going cage-free.

Is Cage-Free Enough?

Whether it makes sense to push the needle even further, to free-range, is controversial. Poultry scientist Ken Anderson argues that free-range, like Pete and Gerry's eggs, is unattainable for large-scale production. "We're trying to produce food for soon-to-be 9 billion people. You can't do it with [free-] range production. We don't have enough space," he says. "We have a moral obligation to care for our animals in a humane manner, but we still have to produce food and feed people."

A study by Promar International, an agricultural consultancy company (commissioned by the United Egg Producers), estimated that if all the hens in the country were free-range, farmers would need 1,037,000 more acres (that's 1,620 square miles) just to grow the 5.5 billion additional pounds of feed that active hens would require. And at a density of 1,000 hens per acre, they'd need 400,000 more acres (625 square miles) for the hens to live. The U.S. has this kind of space, but no one knows whether converting all that land is possible, environmentally healthy or prohibitively expensive, especially since an estimated 1 million acres are lost annually to industry, urbanization and roads.

One answer at the consumer level is to cut back on the number of eggs we eat, says Balk. "We advocate three approaches to our food choices: reduce consumption of meat and other animal-based foods; refine the diet by avoiding products from the worst production systems, such as switching to cage-free eggs; and replace animal-based foods with plant-based foods." About 70 percent of eggs produced in the U.S. are sold whole in shells. Thirty percent are further processed into liquid, frozen or dried "egg products." These are used in processed foods, such as mayonnaise, ice cream, cakes and cookies, or in restaurants and food-service food. Consumers concerned about animal welfare can impact that sizable 30 percent chunk of the egg industry by skipping processed foods made with eggs.

On the national level, there's precedent to make the incremental step to cage-free. The European Union banned conventional battery cages in 2012, and several U.S. states now have their own laws. Producers have to switch their cages every 10 to 15 years anyway; why not replace them with cage-free systems, say proponents. It would still be a major overhaul, and the transition would cost a lot of money. Often they can use the same barns, but with fewer hens per barn, some barns would have to be built to make up the difference, and operating costs would be a higher, as the CSES study showed.

Opponents say the cost increase of going cage-free will make life tough for low-income families who rely on inexpensive eggs as a healthy protein source. One study (funded by the National Pork Council) found that egg prices in California increased 49 cents per dozen after the law went into effect. That's an increase of $14 per person per year, or $70 per family. Still, "Consumers' minds should be blown that you can buy a dozen eggs for 99 cents, but somehow they're not," LaFlamme says with a laugh. "You pay $5 for a latte, but people are just not sure about that organic dozen eggs for $5."

Consumers concerned about animal welfare can impact that aspect of the egg industry by skipping processed foods made with eggs.

But consumer demand is going in that direction anyway and, with it, the entire egg industry. Balk sums it up: "When you have the Humane Society of the United States, McDonald's, Walmart and three of the top four egg producers all saying the same exact thing, you know that you've found common ground and are moving the industry in a better direction."

AT 7:45 P.M., THE OVERHEAD LIGHTS START TO gradually dim in the cage-free aviary facility, mimicking dusk. Our hen notices it, hops back into her colony enclosure and finds an elevated roost. There she perches, safe from predators. She has never gone outside, but still, after a day of laying an egg in a nest box and avoiding harsh pecks from a few type-A hens, she's tired. The lights go out completely 15 minutes later, the squawks of the other 49,841 hens quiet down, and the house rests. ●

COMPLICATED CUPS

A morning isn't complete without a great cup of coffee. But are you paying attention to what's going on behind the beans—how they were grown and got from bush to cup?

BY BARRY ESTABROOK

To get from Costa Rica's car- and truck-choked capital, San José, to the town of Santa María de Dota, I had to travel over Cerro de la Muerte, or "Mountain of the Dead." It's well named. On one side, the land plunged away so precipitously that I averted my eyes. For two and a half hours, the Pan American Highway wound south. Then, as if to confirm my worst fears, the road suddenly disappeared, forcing my driver to skirt an ugly gash of rubble and mud where an avalanche had sent a tennis-court-size hunk of the asphalt tumbling into the abyss. We emerged onto the rim of a bowl-shaped valley. Jagged 7,000-foot peaks embraced it on all sides. Clouds and mist partly cleared to reveal rain forest interspersed with rows of the dark green shrubs that bear coffee. It seemed impossible that the vegetation could maintain roothold on the nearly vertical hillsides. Santa María de Dota, with its red rooftops and symmetrical grid of streets, was nestled at the bottom. In the world of coffee, Santa María de Dota is a kind of Shangri-la, sustained by a new financial arrangement the industry calls "direct trade." As the name implies, foreign roasters deal directly with individual farmers or cooperatives of small growers. Unlike Fair Trade, Rainforest Alliance or USDA Organic, direct trade is based on no formal certification program, but advocates claim that it's much better than any of those for growers, roasters and consumers—good coffee in all senses of the word. The 800 small family farmers whose beans are prepared for export at Santa María de Dota's local co-op, which is called Coopedota, get 40 percent more for their coffee through direct trade than they would if forced to sell—like oil and sugar—on the open commodity market. Even so,

80 PERCENT OF COOPEDOTA'S COFFEE IS SOLD THROUGH DIRECT TRADE.

most of their plots are too small (five acres on average) to fully support a family. Producers need to supplement their coffee income with other crops or off-farm jobs. I spoke with Roberto Mata Naranjo, a grower who operates a modest 40 acres with six other members of his family and also serves as the general manager of Coopedota, and asked him where the town would be without direct trade. He slit a finger across his throat and said, "Dead."

The Global Coffee Market

Coffee is a huge business. Consuming countries import about $25 billion worth a year, and the United States leads the pack by a wide margin, buying $6 billion worth, about one-fifth of the world's total. Coffee is one of our most valuable food imports. About 125 million farmers and laborers in approximately 50 tropical countries on both sides of the equator earn a living from coffee. Coffee exports are the lifeblood of the economies of many of these countries. In Ethiopia, for instance, coffee brings in 30 percent of the struggling country's foreign exchange. It is also Vietnam's major agricultural export. Unfortunately, the vast majority of the world's coffee growers do not benefit from direct trade deals. Most sell on the volatile commodity market, sometimes through unscrupulous middlemen who pay them as little as half the commodity price. Although Americans love to grumble when coffee prices rise (President Eisenhower went as far as ordering the Federal Trade Commission to investigate coffee producers during a price spike in the 1950s), only a small fraction of what we pay reaches the farmers and even less trickles down to the seasonal harvesters. Research shows that only about $1 of a $13 bag of specialty beans from a U.S. store reaches farmers. In Ethiopia, where coffee originated, a worker makes only $1 a day. A Guatemalan

harvester brings home more—about $3 a day—but not enough to feed a family. For some, the situation is more dire. The U.S. Department of Labor has found evidence of child labor in 14 coffee-producing countries. In Coopedota, by contrast, a coffee picker gets $3.50 an hour.

The Toll on the Environment

In addition to leaving producers in abject poverty, coffee production has also become a serious environmental issue. Traditionally, it was hard to distinguish between coffee farms and undisturbed stands of tropical forest. The arabica coffee variety has long been the industry's mainstay. It evolved to live in the shade under the rain forest canopy in the mountains of eastern Africa and still grows best beneath trees. This is good for indigenous mammals, reptiles and birds. Tree roots prevent erosion. Decaying leaves fertilize the soil. The resident birds and bats devour insect pests, making chemical insecticides unnecessary. Today, arabica still accounts for almost two-thirds of global production. But in the 1970s, according to University of Texas researcher Shalene Jha, agronomists began urging farmers to plant new hybrid coffee plants of the robusta variety. Robusta thrives in full sun. It provides huge yields of lower-quality beans that usually find their way into instant coffees and most of the preground canned offerings on supermarket shelves (canned arabica grounds say so on the label). Growers around the world started clear-cutting forests and planting monoculture fields of robusta, as treeless as any Iowa cornfield. The hardy plants grow well but demand massive applications of chemical fertilizer and consume enormous amounts of irrigation water. The result is rampant pollution and habitat destruction. Between 1996 and 2010, shade-grown coffee dropped from 43 percent of the total production to 24 percent as swaths of robusta took root in nations like Brazil and Vietnam. Today, coffee production is contributing to deforestation in 10 of the 11 most threatened world forests, according to the World Wildlife Fund. In Central America, a critical overwintering ground for migratory birds, 2.5 million acres have been cleared. The results are staggering. "Over a third of migratory bird species in North America have significantly declined in the past 40 years," Pete Marra, head of the Smithsonian Migratory Bird Center in Washington, D.C., told me. "Habitat destruction is a key factor, and agricultural development is a big contributor to that. It's critical to do anything we can to preserve bird habitat." Growers of finicky arabica bushes also face a threat: climate change. Although arabica is a tropical plant, it suffers when the temperature becomes too hot, especially at night. Arabica is comfortable at the same temperatures we are—between 65° and 70°F. Alessandro Craparo of the University of the Witwatersrand in South Africa recently published a study showing that if nighttime temperatures rise by slightly less than 2°F in the farming regions of Tanzania, the typical smallholder's yield will be cut by 30 percent. Craparo chose Tanzania because coffee is the country's most important export crop and also because the climate in its highlands is similar to that in other coffee-producing countries. "Attention should be drawn to the arabica-growing regions in Brazil, Colombia, Costa Rica, Ethiopia and Kenya" as well, he wrote in the study.

About 125 million farmers and laborers in approximately 50 tropical countries on both sides of the equator earn a living from coffee.

Direct Trade Economics

Taken together, these factors add up to a lot of ethical problems to address before you are fully awake in the morning. Several well-intentioned groups have established certification programs to simplify your decisions. Unfortunately, each of these organizations focuses on a specific problem with coffee production, and they all share one major flaw. "These organizations may help producers and conscientious shoppers, but because they don't include quality specifications, they do nothing for a consumer looking for a delicious cup of coffee," says Dan Cox, president of Coffee Enterprises, a Vermont-based industry consultancy. And none offer one-stop shopping for those hoping to buy beans that are good for producers and the environment—except direct trade. "Direct trade is not a certification," Coopedota's Roberto Mata explained. "It's a market-driven relationship. We become partners with the roasters and agree on price levels that work for both of us." Mata said that the direct-trade price

is considerably higher than what he would receive through Fair Trade. "With Fair Trade, you still have all those middlemen." Coopedota is certified by the Rainforest Alliance, but that brings in only about 10 cents a pound extra. Growers of organic beans get about 15 cents more. However, none of the certification programs alone provides enough of a premium to make production financially viable in Costa Rica, where the cost of labor is higher than in most other coffee regions. I was introduced to Mata by Geoff Watts, who directs sourcing for Chicago-based Intelligentsia Coffee. Watts is an intense man with short hair that's just beginning to gray. Intelligentsia, along with Counter Culture Coffee (based in Durham, North Carolina) and Stumptown Coffee Roasters (of Portland, Oregon), is credited with introducing the concept of direct trade to the United States in the early 2000s. "Before that, we were buying a lot of Fair Trade coffee," Watts said. "But we learned that there was a lot more we could do." He says the opacity of most traditional coffee contracts is the reason farmers get exploited. In direct trade, the farmer sees how much everyone in the supply chain receives. The contracts remain in force when coffee prices are low and when they are high.

They also commit to what Intelligentsia calls "healthy environmental practices" and "sustainable social practices," although the company doesn't outline what, exactly, those terms mean. Much like the term "local," the words "direct trade" carry no guarantee—you have to trust the company that you're dealing with, just as you trust the vendors at the farmers' market or the chef at a farm-to-table restaurant. "My advice to customers is to look for detail. Is the roaster's buying philosophy clearly spelled out? Are there detailed descriptions and photographs of the farms? Where are they, what's the elevation? What is the coffee variety? The more details that the description of a coffee has, the more likely it is that whoever is selling that coffee has truly engaged with the grower," said Watts.

Coffee's Future

Today, direct trade provides little more than a drop in the ocean of coffees, lattes, espressos and other coffee beverages consumed, and its environmental and economic benefits reach only a small fraction of the world's producing areas. But that is changing, according to Watts. He says that much like the beer industry, where large corporations are waking up to the success of artisanal microbreweries and adopting their strategies (or buying the smaller brewers outright), international coffee companies have created specialty coffee divisions that use direct-trade practices—such as purchasing beans from farmers and putting their names on the containers consumers buy—promoting quality and sustainability to differentiate these coffees from the rank and file. Growers are also becoming more market savvy. Producers have begun to look beyond their traditional buyers to establish relationships with foreign buyers. Once a rare sight at international coffee trade shows, farmers are showing up in increasing numbers and meeting face-to-face with the baristas and roasters to establish ties. "Direct trade could eventually have a substantial influence and compel consumers to think more conscientiously about coffee and change their relationship to it," Watts said.

In the future, the Coopedota farmers will need the benefits of direct trade even more than they do today. The climate in the area has warmed dramatically. Formerly, coffee there was grown at elevations between 5,000 and 5,500 feet above sea level. Hotter weather now requires farmers to grow it in fields as high as 6,500 feet as yields at lower levels are declining. The warm weather has allowed a fungal disease growers call rust to spread from Brazil and Colombia to parts of Central America, including Coopedota. "Preventing and catching rust costs money, plus productivity drops," Mata said. "We are treating it with chemicals that are less harsh than ones others use because they are better for the farmers and the consumers. But they cost more. The roasters we deal with understand this, so they are willing to pay."

I picked up a bag of beans before leaving Santa María de Dota. After my return, I made myself a cup every morning. It had a sweet, clear flavor with hints of spice, and sipping it, I felt connected to the little town in the Costa Rican mountains more than 3,000 miles away. Drinking coffee that's good in all ways is worth a little extra effort. And money. Based on the price of a pound of Coopedota and the number of cups I made from it, the cost of enjoying my morning cup of some of the world's finest coffee came to about 40 cents a day. ●

How to Brew the Best Cup

I went to Gimme! Coffee, a highly acclaimed roaster and retailer of specialty coffee near Ithaca, New York, to learn how to brew the best cup of coffee possible. Liz Clark, who is responsible for overseeing the sourcing and quality control of the company's coffee and who serves as director of education, showed me how to do exactly that.

By Barry Estabrook

High-end specialty coffee is the only kind served at Gimme! Coffee in Ithaca, New York.

1 **USE REALLY GOOD WATER.** "We're obsessed with good water. If you don't have great-tasting water from your tap, use bottled," she said, brandishing a jug of Poland Spring, which is a popular bottled brand in the Northeast. Coffee is 99 percent water. "Don't use distilled—it can result in bitterness." Otherwise, Clark recommends using a water filter.

2 **GRIND, THEN BREW IMMEDIATELY.** "Fifteen minutes after beans are ground, you start losing the volatile aromatics that give coffee its scent and flavor, and after 24 hours, they're pretty much gone," Clark said. She poured a few beans into a grinder and switched it on until they ran through, then dumped them in the compost bin, just to purge any residue from previous grindings. (She also regularly cleans her mill with tablets called Urnex Grinds.) "Use a burr, or mill, grinder rather than a blade grinder," she said. Unlike blade grinders, which give uneven results, burr grinders produce a uniform grind. You also lose less of the essential oils, which get whacked out by blade grinders. "It's also important to buy fresh beans," she said.

3 **DRIP IT.** Clark prefers the drip method (also referred to as pour-over) for her morning coffee. It delivers an excellent cup with minimal hassle. Her tool of choice is a Chemex coffee maker, a simple device with two glass compartments, one above the other. The coffee grounds are put into a paper filter in the top compartment and water is poured over them.

4 **USE THE GOLDILOCKS PRINCIPLE.** The correct water temperature, neither too hot nor too cold, is necessary for a good cup. Ideally, according to Clark, it should be between 198° and 204°F—several degrees below water's boiling point. At home, you should let the kettle cool for a few minutes after it comes to a boil. But as with every aspect of her coffee ritual, Clark prefers to be precise. Plus, she's a bit of a gadget geek. She heated the water in an electric kettle with a thermostat that can be set to warm the water and then hold it at the ideal temperature range—in this case 202 degrees.

5 **POUR SLOWLY AND EVENLY.** After checking the temperature gauge, Clark dribbled a little water over the ground coffee, just enough to moisten it. Once it had soaked in, she poured more water in and then stopped. "You want to let the gases escape," she explained, and sure enough, bubbles rose to the surface of the grounds and then burst. She poured the remaining water over the grounds slowly and in a circular motion to ensure that it was evenly distributed.

6 **AVOID THE CARDINAL SIN.** Even after you've brewed great coffee, it can be ruined by a mistake that's all too common. Never leave coffee sitting on a heating element, such as those found on many automatic-drip coffee machines. A good rule of thumb, Clark said, is never to drink a cup of coffee that was brewed more than an hour earlier.

SLEEP STORIES

TIRED ALL THE TIME?

If you are having trouble renewing your energy even after a full seven hours of sleep, one of the common causes of fatigue might be to blame.

BY ELENI N. GAGE

Exhaustion is normal now and then (sick kid, late nights at the office). And in those cases, the solution is as simple as hitting the sack an hour or two early to recover. But if you are chronically tired, something more serious could be to blame. "Fatigue is a common symptom of many health conditions," says Grace Keenan, M.D., an internist in Ashburn, Virginia. Fortunately, most of these ailments are easy to remedy. Here, experts arm you with solutions so you can get back your get-up-and-go.

A Vitamin or Mineral Deficiency

Having low levels of iron or vitamin D or B_{12} can make you feel tired, anxious and weak, says Irene Park, a nurse practitioner in New York City. Many experts believe that a significant percentage

of the U.S. population is deficient in vitamin D. "And lower levels of vitamin D can cause muscle weakness and pain," says Keenan. Also, if you're a woman of reproductive age, you're statistically at greater risk for iron-deficiency anemia.

The only way to tell if you're low in any vitamin or mineral is to see your doctor for a blood test. Meanwhile, to bolster your body's stores, consider taking a multivitamin with at least 100 percent of your daily requirement of vitamins and minerals. (Experts generally advise that healthy adults also supplement with 1,000 to 2,000 international units of vitamin D daily.)

The Blues

Research has indicated that people with depression may be four times as likely as the nondepressed to experience unexplained fatigue. Aerobic exercise—specifically, 30 minutes or more three to five days a week—is effective at treating mild to moderate depression and may minimize the sleepiness associated with it. If that doesn't help, however, speak to your doctor, who may recommend talk therapy or a mood-boosting medication, like a selective serotonin reuptake inhibitor (SSRI). If your depression and related fatigue seem to strike more frequently in winter, you could have seasonal affective disorder (SAD). Treatment for SAD may include using a special light box, says Marla Wald, M.D., a psychiatrist at Duke University Medical Center in Durham, North Carolina. But venturing outside for about 20 minutes a day can provide similar benefits, she says.

Your Adrenal Glands

They're responsible for secreting the fight-or-flight hormones adrenaline and cortisol, which

surge as a response to stress—whether the prehistoric-days type, like being chased by a tiger, or the modern-day version, like financial worries or your mother-in-law. But when you're feeling stressed all the time, those glands may become overworked and can tire out—a condition commonly called adrenal fatigue, says Keenan. The inability to secrete enough cortisol during the day can cause energy dips, then spikes at night that can interfere with restful sleep. To give your adrenal glands a chance to recharge, Keenan recommends meditation, which she thinks of as parking the body in neutral. "Meditation has the effect of slowing down the production of cortisol for a while," she says. Try sitting quietly and clearing your mind for at least five minutes a day. Vitamins B_5 and C have also been shown to support adrenal function, says Jacob Teitelbaum, M.D., the Kona, Hawaii, medical director of the Fibromyalgia & Fatigue Centers and the author of *From Fatigued to Fantastic!* He recommends getting at least 50 mg of B_5 and 500 mg of C daily. Other stress-reduction techniques work well too. "Exercise is particularly effective," says Park.

What You Drink and Eat

Caffeine can be a lifesaver on sleepy mornings, but too much may be problematic, since it can act as a diuretic. "And dehydration can cause fatigue," says Bonnie Taub-Dix, a registered dietitian in New York City. Aim for at least eight cups of fluids a day, more if you eat a lot of high-fiber foods, which absorb water.

Food sensitivities and their side effects can also bring on fatigue. "Lactose intolerance, for example, can cause diarrhea, which can result in dehydration," says Taub-Dix. Teitelbaum notes that a diet high in processed foods can aggravate food sensitivities and lead to fatigue (one such sensitivity is the inability to metabolize gluten, which is found in many processed foods). An internist or a registered dietitian can determine if you have a food intolerance. When you're suffering from GI-related complaints, a dietitian might recommend an elimination diet, in which you eliminate specific foods for a period of time and then slowly reintroduce them and monitor your symptoms for possible reactions.

A Stealth Sickness

When nothing else seems to be at the root of your fatigue, consider seeing a doctor. Fibromyalgia and chronic fatigue syndrome commonly cause intense tiredness, in addition to poor sleep quality, brain fog and muscle pain. (Hypothyroidism, an underactive thyroid, often occurs with the disorders.) Much is not understood about fibromyalgia and chronic fatigue syndrome, but doctors estimate that up to 14 million Americans suffer from one or the other.

And women are more likely than men to experience them. "There's usually a genetic predisposition," says Kent Holtorf, M.D., a Los Angeles thyroidologist and the founder of the National Academy of Hypothyroidism. Some doctors surmise that fibromyalgia is a result of abnormalities in the central nervous system and that chronic fatigue syndrome is linked to infection. Other experts think both conditions are a result of a dysfunction of the hypothalamus and the pituitary and adrenal glands. Most standard blood tests fail to identify the disorders, so the conditions are typically diagnosed through a physical exam and a detailed medical history. Standard treatment may include an SSRI or a muscle relaxant.

Fibromyalgia and chronic fatigue syndrome commonly cause intense tiredness, in addition to poor sleep quality, brain fog and muscle pain.

Another disorder that may be to blame: obstructive sleep apnea. A person who suffers from it experiences repeated pauses in her breathing while sleeping, often because she has narrow airways in her nose, mouth or throat (some telltale clues: loud snoring or gasping for breath while sleeping).

If your doctor considers your sleep history and suspects sleep apnea, he or she will send you to a specialist for treatment or to a sleep clinic for an overnight evaluation. Treatment may be as simple as changing your sleeping position or wearing an oral appliance, or as complex as sleeping in a mask attached to a C-PAP (continuous positive airway pressure) machine. In extreme cases, surgery may be necessary. ●

SLEEP STORIES

THE POWER OF A GOOD NIGHT'S SLEEP

You fought off a cold, perfected your tennis swing and had a light-bulb (aha!) moment. Shut-eye does much more than energize you after a long day. Here's how you can make it even more effective.

BY JENNIFER KING LINDLEY

It's 11 p.m. Do you know where your remote is? Good. Now turn off the TV and go to bed. What? You've got an e-mail to write? Laundry to fold? A deadline? News flash: you'll do all these things and more, better and faster, if you've clocked in seven to nine hours of sleep. "A lot of people think of sleep as an inert state, like a laptop switching off," says Jessica Payne, Ph.D., an associate professor of psychology and the director of the Sleep, Stress and Memory Lab at the University of Notre Dame in Indiana. "But during sleep, your mind and body are actually highly active with processes critical for your physical and mental health." In fact, your body even performs certain tasks more efficiently and thoroughly when you're at rest than when you're alert. No wonder sleep is as important to your well-being as diet and exercise.

Sleep Heals

Sleep is not one constant state. It's made up of several distinct stages that take 90 to 120 minutes to complete in total. We cycle through one round of all these stages four to five times per night, going from light sleep to deep slow-wave sleep to dream-producing REM (rapid eye movement) sleep. During the first half of the night, we spend more time in slow-wave sleep, which is vital to immune function and body repair. "You have the highest level of human growth hormone during the first part of the night," notes Janet Mullington, Ph.D., an associate professor of neurology at the Division of Sleep Medicine at Harvard Medical School. This hormone fuels growth in children and helps maintain tissues and organs throughout life.

White blood cells, the body's infection fighters, ramp up their circulation too. A 2012 study

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SHIELDING YOURSELF FROM DISTRACTIONS DURING SLEEP MAY LET NEW MEMORIES BE STRENGTHENED AND RETAINED FOR MUCH LONGER.

published in the journal *Sleep* found that subjects who typically slept more than seven hours a night were more likely to develop immunity to hepatitis B after vaccination than were those who clocked less than that amount. Another study, published in the *Archives of Internal Medicine* in 2009, found that participants who slept less than seven hours a night were nearly three times as likely to develop a cold when exposed to a virus as those who enjoyed eight hours or more of rest. One possible reason? Sleep deprivation is thought to reduce the natural killer cells that can help ward off infection.

Insufficient sleep has also been linked to greater risks for all kinds of health problems, including heart attack, stroke, diabetes and inflammation. "People often say to me, 'I'll sleep when I'm dead,'" says Shelby Harris, Psy.D., a licensed clinical psychologist in private practice in White Plains, New York, who specializes in behavioral sleep medicine. "I tell them, 'That's going to happen sooner if you continue with that philosophy.'"

Subjects who slept in a room with the scent came up with more-innovative ideas than did those who slept in an odorless environment.

Make your sleeping environment as dark as possible. A 2010 study published in the journal *Cancer Causes & Control* found that countries that generate the most artificial light at night, such as the United States, also have the highest incidence of breast cancer. Experts theorize that light makes your brain think that it must be morning, throwing off your circadian rhythms and robbing you of the most healing portions of sleep.

It Enhances Memory

Sleeping acts like a "spring-cleaning" for the brain, says Penelope Lewis, D.Phil., a neuroscientist at the University of Manchester in England and the author of *The Secret World of Sleep*. Cerebrospinal fluid washes through the brain's crevices, flushing away waste materials that have built up in the cells over the course of the day. Among the toxins that are flushed: the potentially memory-robbing protein fragments that can form plaques in the brains of patients with Alzheimer's disease.

At the same time, the sleeping brain acts as a memory curator. You take in reams of information during your day—from the hold music on a phone call to a memo from your boss. At night, freed from distractions, your brain decides what's crucial to store in long-term memory (that memo) and what's OK to forget (the words to that Air Supply song). "It's like cutting out the background noise or removing the static on a radio," says Lewis.

In addition, sleep may help procedural memory, the kind used when learning how to perform a new skill, like a golf swing. "Activities that get practiced during the day get replayed in your brain during sleep, even though you're not actually practicing," says Lewis. In a 2014 study published in the *Journal of the American Geriatrics Society* that examined the cognition of female nurses 70 years old and older, researchers found that participants who slept five hours or less, or more than nine hours, had worse cognition that equated to being two years older.

While nothing beats seven to nine hours of uninterrupted sleep, research suggests that naps may be helpful too, at least when it comes to acing a recall-based test. For a 2013 University of Massachusetts Amherst study, researchers asked about 40 preschoolers to memorize pictures. Those who had napped before getting retested later in the day remembered more of what they had seen.

It Boosts Creativity

John Steinbeck was right when he wrote, "It is a common experience that a problem difficult at night is resolved in the morning after the committee of sleep has worked on it." That committee consists of billions of busy neurons, all meticulously looking for patterns and connections between new memories and existing knowledge sometimes in unexpected, problem-solving ways. REM sleep (you know, that point when Abraham Lincoln magically surfaces and plays chess with a talking beaver?) may be the most fertile time for such epiphanies. "When you dream in REM sleep, the rational control center of the brain is deactivated," says Dr. Payne. "This produces an amazingly creative state, and you are able to come up with ideas that you would not be able to when you are awake." Paul McCartney reportedly conjured up the melody of "Yesterday" in a dream. Stephenie Meyer awoke from sleep with the idea for the *Twilight* series.

There's no guarantee that you'll invent the next Twitter or Facebook, but with the right amount of sleep and a little know-how, you might think up a gift idea that your mom will actually love. All you have to do: contemplate your conundrum (provided it doesn't stress you out) as you brush your teeth before hitting the sack. The timing will tell your brain that the problem is important so that once you're sleeping, your brain may produce an out-of-the-box answer.

You can also help out your neurons with overnight aromatherapy. In a preliminary study published in 2012 in the *Journal of Sleep Research*, scientists gathered participants in an orange-vanilla-scented room in the evening, showed them a video on volunteerism and then asked them to return in the morning with suggestions for getting people to volunteer more often. Subjects who were assigned to sleep in a room with the same scent came up with more-innovative ideas than did those who slept in an odorless environment. The subtle aroma may have primed their brains to work specifically on the problem they associated with the smell, says Maarten Bos, Ph.D., a social psychologist and one of the study's co-authors. To give this a try at home, scent your work area with a distinctive fragrance while you brainstorm for a project, then diffuse the fragrance in your bedroom before you sleep.

It Keeps Weight in Check

You may be just lying there, but your sleeping body is still burning calories. "In REM, your brain is active, chewing up glucose especially quickly," says Michael Breus, Ph.D., a clinical psychologist in Scottsdale, Arizona, and the author of *The Sleep Doctor's Diet Plan: Lose Weight Through Better Sleep*. Adequate sleep is also associated with a faster metabolism overall, meaning that you burn calories more quickly all night and throughout the day. In contrast, "the more sleep-deprived you are, the harder it will feel like you have to work to burn each calorie," says Dr. Breus. When your body senses a longer waking day, it tries to conserve energy by shifting its metabolism to a slower speed.

And did you ever wonder why a typically unappetizing bear claw suddenly looks amazing when you're pulling an all-nighter (or trying to get through the next day after one)? Because sleep helps regulate appetite, people who are sleep-deprived produce more ghrelin, a hormone that increases feelings of hunger, and less leptin, a hormone that lets you know that you're full. Also, when you're tired, you crave a quick hit of energy, and that's most easily acquired through sugary junk food. (Come to Mama, chocolate-glazed doughnuts.)

Another tip: turn down the thermostat. Researchers at the National Institutes of Health assigned healthy volunteers to sleep in either a 75°F room or a 66°F room. Sleepers in the colder room burned 5 to 7 percent more calories than did their warmer counterparts, probably because their bodies had to work harder to maintain their internal temperature. Neither group used blankets. So, alas, you can't turn down the thermostat and then snuggle under a comforter.

It Helps Conquer Stress

Scientists have noticed that a well-rested brain is better at putting the brakes on the amygdala, the almond-shaped structure that activates emotional responses (anxiety, impatience, anger), while also eliciting activity in the parts of the prefrontal cortex where reasoning occurs. The opposite often occurs when you're sleep-deprived: the amygdala races into overdrive, and the prefrontal cortex hangs back. Hence that "I said, 'Double espresso!' " freak-out at Starbucks.

Skip the late-night cocktail. While alcohol may help you unwind, it shortens the amount of time you spend in REM sleep. Also, "if you've experienced an emotionally distressing event, whether it's sad or frightening or anxiety-provoking, going to sleep will typically strengthen that distressful memory," says Katherina Hauner, Ph.D., a neuroscientific researcher at Northwestern University, in Chicago. (Again, sleeping makes the last thing we did more vivid in our minds.)

So if you had an argument with your spouse, spend some time "working through the distressing emotions before going to bed or taking a nap so that those memories seem less upsetting before falling asleep," says Hauner. If you're calm when you close your eyes, you'll probably wake up calm too. ●

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EVEN IF YOU HAVE A $50,000 MATTRESS, A STIFF PILLOW CAN LEAD TO A BAD NIGHT'S SLEEP.

SLEEP STORIES

SHAKE IT OFF!

This-really-works strategies to get rid of that tired feeling for good.

BY SARA GAYNES LEVY

Ah, the vicious cycle of feeling low on energy: you don't sleep enough, so you wake up crabby and fatigued, with no desire to eat well or exercise. By 4 p.m., you're so sapped that you can barely function. "All these elements are totally intertwined" when it comes to energy, says Josiane Broussard, Ph.D., an assistant professor of health and exercise science at Colorado State University in Fort Collins. "You're less likely to power through your tiredness to go to the gym and make better food choices and then get better sleep." So before you know it, the whole cycle starts again.

It's happened to nearly all of us, and it is not fun. But it is fixable—you just have to know where to start. The best way to feel powered up and alert all day long, experts say, is to use the three building blocks of energy: start by focusing on your sleep,

then examine your food choices, and finally work on including some exercise in your day. You'll be bounding through the afternoon in no time.

First, We Sleep

There's no shortcut for this one. "Quantity and quality of sleep is one of the best predictors of energy," says James Maas, Ph.D., a sleep consultant and the author of *Sleep for Success! Everything You Must Know About Sleep but Are Too Tired to Ask.* And sadly, many of us are skimping on this crucial energy resource. "We treat sleep as a luxury, and it is anything but," says Dr. Maas. "I'd estimate that most Americans get an hour less than they need to have the energy they require." Give yourself permission to put sleep on top of your to-do list. "If you have to choose between sleep and something else [like fitting in a workout], lead with sleep," says Dr. Broussard. "If you're too tired to exercise, you might not get a great workout. If you're tired, you might also be eating crappy food." And all of that drags you back down. Good rest, on the other hand, helps set you up for success. To work more sleep into your schedule, start small: try moving your bedtime up by 15 minutes each night, suggests Maas, until you make it through the whole day without feeling that telltale drag. Another way to find your body's ideal schedule is to try this the next time you're on vacation: on the third or fourth night, when you're starting to feel relaxed and you've made up any sleep debt you might have gone into the trip with, go to bed whenever you feel tired. Wake up without an alarm. "That's your true sleep need," says Broussard. "For most people it's a lot more than they think. Even though you might think you're doing OK, there's some impairment that you're not able to see."

If you have coffee 20 to 30 minutes before an important task or meeting, the alertness can help you produce more focused work.

Once you've figured out the amount of sleep you need, you can work on the quality of your rest. Do your best to go to sleep at the same time every night and wake up at the same time every morning—yes, even on the weekends. If you have a random schedule, "your body never knows when to shut down," says Maas. "You'll feel jet-lagged without leaving home." And check your sleep environment: Make your room as dark as possible, keep the temperature cool (shoot for 65 to 67°F), and invest in bedding you love—you really want to be comfortable.

Next, Tweak the Diet

Whether or not you're sleeping enough, food is a crucial part of the energy equation. If you're sleep-deprived, your body will often crave foods that offer quick energy (translation: sugar) to make up for it. But even if you're sleeping just fine, you could feel low energy because you aren't eating frequently enough, explains Marjorie Nolan Cohn, R.D., a spokesperson for the Academy of Nutrition and Dietetics. Her recommendation is to go no longer than four hours between meals. "So if lunch is at noon and dinner is at eight, you need a mini meal in between."

Food choices can also be used to boost your energy over time (not just immediately after you eat), explains Cohn. Anything high in antioxidants, like berries and pomegranates, can build long-term wellness by working to neutralize free radicals in your body. "Free radicals are a stressor to the body, and over time that stress can build up, compromise the immune system and have a systemic effect on how you feel," she says. When it comes to beverages, there's great news: caffeine is not evil. Coffee is definitely OK—in fact, if you have a cup 20 to 30 minutes before an important task or meeting, the alertness can help you collaborate better and produce more focused work, research has shown. "We found people are more focused in their discussion of a target topic after consuming coffee," says Vasu Unnava, Ph.D., an adjunct assistant professor at the Graduate School of Management at the University of California, Davis. (Just try to keep that meeting before 2 p.m., since consuming caffeine in the afternoon can negatively impact sleep, says Maas.) Matcha is also growing in popularity and provides a caffeine boost that many fans say comes without a crash. "Plus, matcha has a higher antioxidant level than coffee [though both choices have them], and the energy boost is more sustaining due to the amino acid L-theanine, which can have a calming effect," says Cohn.

When You Can, Exercise

The final piece of the energy puzzle is exercise. If you have time, getting your heart rate up is an almost guaranteed way to shake you out of a slog. "Exercise brings the hormones that are responsible for our fight-or-flight reaction to the party. They push fatigue to the side and say to your body, 'You don't have time to be tired right now,'" says Sabrena Jo, the director of science and research content for the American Council on Exercise. "Even if you don't feel like it, just the act of getting started can set that reaction in motion." Go for a walk, do some squats in your cubicle, pop into a quick plank pose. Let go of the idea that it needs to be 30 minutes to count. Anything counts, for any amount of time, Jo says. (The American Heart Association's guidelines recommend 150 minutes of moderate exercise each week, but don't let that number deter you: doing as much as you can, when you can, will still give you a benefit.) You may be thinking that exercise takes too much of that already-scarce energy, but in reality, the more often you work out, the more efficient your muscles become. "So it takes more for you to become fatigued in the first place," says Jo. And the more endurance you have, the better equipped you are to make it through those marathon days.

Exercise can help you sleep better too: just experiment to figure out the best timing for you. Jo says some people find that exercise at the end of the day leaves them the perfect amount of exhausted by bedtime, whereas other people feel too revved up by it and do better with an a.m. session. "Even a 10-minute walk in the morning and 10 minutes at night works. You don't have to go to the gym or even change out of your clothes," says Jo. You can even use movement to wind down before bed: "Lying on your back with your legs up the wall [for a few minutes] is great for calming down," says Joanna Cohen, an instructor at Y7, a yoga studio in New York City. "Combine it with deep breathing to activate your parasympathetic nervous system and help your body prepare for sleep." When you're done, climb in bed and get ready to actually jump out the next morning. ●

A Better Breakfast

Switch up your morning routine with these fresh and fun breakfast ideas.

Baked Eggs, Tomatoes & Chiles (*Shakshuka*)

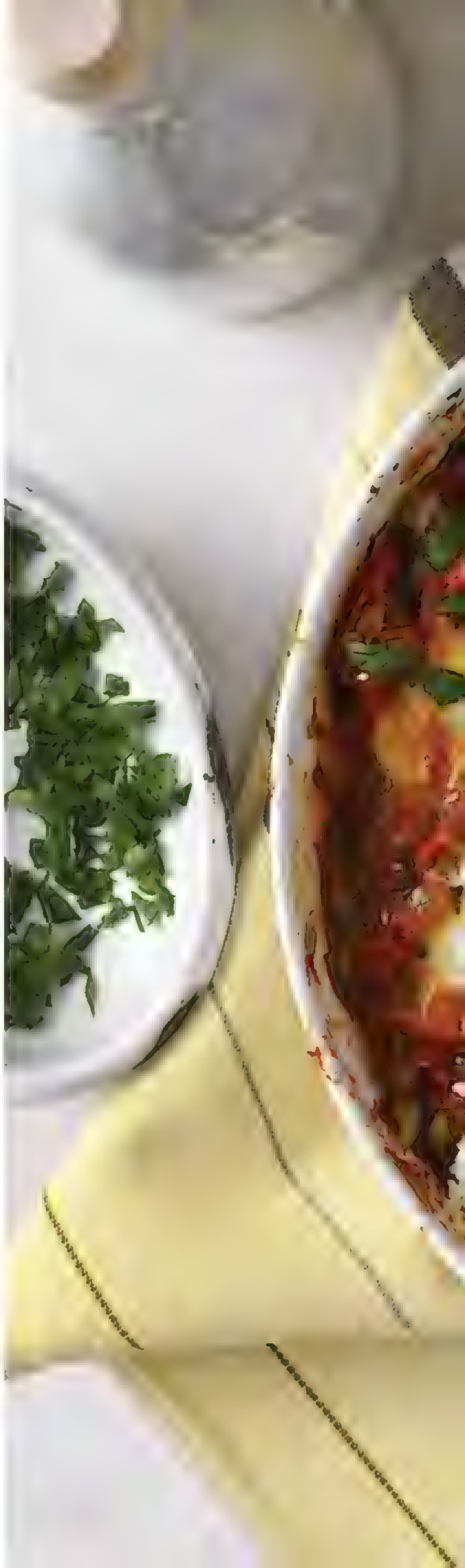
ACTIVE: 45 min
TOTAL: 1½ hrs
TO MAKE AHEAD: Refrigerate tomato sauce for up to 4 days.

This popular Israeli breakfast or brunch dish features eggs cooked on a bed of roasted tomato sauce. Serve with warm crusty bread.

- **3 cloves garlic, divided**
- **3 pounds ripe plum tomatoes, cut into ½-inch pieces**
- **1 medium onion, finely chopped**
- **4 tablespoons extra-virgin olive oil, divided**
- **2 tablespoons chopped fresh parsley, plus more for garnish**
- **¾ teaspoon salt, divided**
- **½ teaspoon ground pepper, divided**
- **2 large green chiles, such as Anaheim, finely chopped**
- **1 teaspoon ground cumin**
- **⅓ cup chopped fresh basil**
- **4 large eggs**
- **½ cup crumbled feta cheese**
- **Hot sauce for serving**

1. Preheat oven to 450°F.
2. Slice 2 garlic cloves. Toss with tomatoes, onion, 3 tablespoons oil, parsley and ¼ teaspoon each salt and pepper in a large bowl. Spread evenly on a large rimmed baking sheet or in a shallow roasting pan. Roast until the tomatoes are shriveled and browned, about 45 minutes.
3. Chop the remaining garlic clove. Heat the remaining 1 tablespoon oil in a large skillet over medium heat. Add the garlic and chiles; cook, stirring, for 2 minutes. Add cumin and cook, stirring, for 30 seconds. Stir in the tomato mixture, the remaining ½ teaspoon salt and basil. Bring to a simmer and cook, stirring occasionally, until the tomatoes are mostly broken down, 6 to 8 minutes.
4. Make 4 deep indentations in the sauce with the back of a spoon and carefully crack an egg into each. Sprinkle the eggs with the remaining ¼ teaspoon pepper. Cover and cook over medium-low until the whites are set, 6 to 8 minutes.
5. Remove from heat, sprinkle with feta and let stand, covered, for 2 minutes. (The eggs will continue to cook a bit as they stand.) Garnish with parsley and serve with hot sauce, if desired.

SERVES 4: 1 egg & 1 cup sauce each
CAL 330 / **FAT** 24G (SAT 6G) / **CHOL** 203MG / **CARBS** 19G / **TOTAL SUGARS** 11G (ADDED 0G) / **PROTEIN** 13G / **FIBER** 5G / **SODIUM** 700MG / **POTASSIUM** 965MG



Breakfast Salads

1. Make your dressing. Mash together 1 teaspoon minced garlic and a pinch of salt with the side of a chef's knife or a fork to form a paste. Whisk the garlic paste with 1 tablespoon extra-virgin olive oil, 2 teaspoons red-wine vinegar and a pinch of pepper in a medium bowl.

2. Mix it up. Toss with 3 cups lightly packed baby kale, choose one of the topping combos shown here and serve.

SERVES 1: about 2 cups

Quinoa & Strawberries

½ cup cooked quinoa + ½ cup sliced strawberries + 1 Tbsp. salted pepitas

Bacon & Egg

1 piece crumbled cooked bacon + 1 fried or poached egg

Smoked Trout & Avocado

¼ cup flaked smoked trout + ¼ sliced avocado + 1 Tbsp. finely chopped red onion

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SALAD FOR BREAKFAST? KALE YEAH! KNOCK OUT HALF YOUR DAILY VEGGIE QUOTA IN TWO STEPS.

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Build a Better Bagel

Think beyond the usual cream cheese schmear and load up with these nutrient-dense add-ons.

Spreads

- ❑ Cream cheese
- ❑ Cultured butter
- ❑ Goat cheese
- ❑ Honey

Veggies

- ❑ Avocado
- ❑ Caperberries and capers
- ❑ Cucumbers
- ❑ Microgreens
- ❑ Pickled beets
- ❑ Radishes
- ❑ Red onion

Other Toppers

- ❑ Smoked fish, such as salmon, trout and sablefish
- ❑ Lox
- ❑ Snipped fresh herbs

4 Combos to Try

- ❑ Cream cheese + smoked trout + radishes
- ❑ Goat cheese + smoked salmon + red onion + dill + microgreens
- ❑ Cream cheese + avocado + capers + microgreens
- ❑ Cultured butter + smoked sablefish + radishes + microgreens

Awake All Day

Science-backed research shows that the right food choices, meal timing and lifestyle tweaks can help you power through your day and fight off fatigue by fueling you with sustainable, feel-good energy.